The Indian Agriculturist

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THE INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

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VOL. X.] CALCUTTA :—SATURDAY, JANUARY 3, 1885. [No. 1.

Crop and Weather Report.

[FOR THE WEEK ENDING THE 24TH DECEMBER, 1884.]

General Remarks.—Rain has fallen in places in the Bombay Presidency, in Mysore, and Coorg, in the Berars, and in the Central Provinces and in the Central India and Rajpootana States. In Madras there has been heavy rain in the southern districts, especially in Chingleput, and considerable damage has been caused to crops and houses.

Harvesting continues in Madras. More rain is wanted in Bellary and Kurnool, where the crops are withering. In Mysore prospects are fair ; a good rice crop is being cut in Coorg ; coffee-picking is progressing, but the crop deficient ; a heavy fall in the price of cardamoms has been disastrous to the ryots.

Agricultural prospects continue favourable throughout the Central India and Rajpootana States. In Hyderabad the rice harvest and ploughing for the *rabi* are still in progress ; cotton is being picked in the Berars, and the standing crops are in good condition. More rain is wanted in parts of some districts in the Bombay and Madras Presidencies, where the crops are withering ; elsewhere the condition of the crops is generally good.

In the Punjab the *rabi* sowings have been completed and prospects are good. In the North-Western Provinces and Oudh, the *rabi* crops are flourishing and prospects are very favourable.

In the Central Provinces the rain of the past week has been beneficial to the crops, and prospects have improved. In Bengal the *amun* paddy harvest will be below the average ; the prospects of the *rabi* are promising. The reaping of the *sali* crop continues in Assam and prospects are good. The rice harvest continues in Burmah and a good out-turn is expected throughout the Province.

The public health is generally good, though in Coimbatore the mortality from cholera continues high.

Prices are almost stationary with local fluctuations.

Madras.—Some rain in Anantapore ; prospects in Bellary not improved ; considerable damage to crops and houses in southern districts, especially Chingleput, from heavy rain and floods.

Bombay.—Rain in parts of several districts, more wanted in parts of Sholapore, Dharwar, Kaladgi, and Belgaum, where crops are withering, and scarcity of fodder and drinking water prevails ; standing crops slightly injured by rain in parts of Thana, Khandesh, Surat, and Ahmednugger ; cholera and cattle-disease in parts of six districts, small-pox in parts of ten, and fever in parts of 15 districts.

Bengal.—There has been no rain in any of the districts of the province, except in Dinagepore, where the fall was ·05 ; harvesting of *amun* paddy still continues, the general out-turn will be below the average ; *rabi* crops are coming on well ; the price of rice has fallen in some districts owing to supply of new rice which is coming into the market ; sporadic cases of cholera are reported in a considerable number of districts in Bengal proper, otherwise general health good.

N.-W. Provinces and Oudh.—Weather cold and seasonable ; crops flourishing and prospects good ; poppy has germinated well.

Punjab.—No rain, health generally good ; fever decreasing in the Hissar district ; *rabi* sowings completed ; prospects good.

Central Provinces.—Weather cloudy ; recent rain has been beneficial ; health generally good, prices steady.

British Burmah.—Some cholera here and there, otherwise public health good ; health of cattle also good ; harvesting progressing ; prospects of good out-turn in all districts.

Assam.—Weather seasonable ; mornings and nights cool ; harvest of *sali* crop continues ; public health generally good.

Mysore and Coorg.—Prospects reported fair, and health good.

Berar and Hyderabad.—Weather cloudy ; cotton-picking continues ; crops in good condition ; general health good.

Central India States.—Weather cloudy ; health good ; agricultural prospects excellent.

Rajpootana.—Weather cold and cloudy ; health good ; crop prospects favourable.

Letters to the Editor.

THE NEW SIROCCO TEA DRYER.

TO THE EDITOR OF THE STATESMAN.

SIR,—I used some years ago to write now and then in your paper on tea matters. Possibly now, an occasional letter would be acceptable. Tea machinery has made great strides since those days. There are now many machines by different inventors for each process. The difficulty is, even for experts, to say which is the best among the many rollers, dryers, sifters, equalisers, and what not. I am not here going to pronounce an opinion. It may be, as many say here of tricycles (a subject to which I have lately given attention) there is no best, for each, perhaps, excels in some way. One opinion though I must give as regards tea machinery, and I feel sure it is a sound one. No "leaf-witherer" has yet been invented. Some inventors of dryers advocate their machines as fit to wither leaf. In practice all planters know it is not so. No machine fit to fire tea will ever wither leaf well. The necessities for the two machines are quite different. The leaf-witherer has yet to be invented.

But it is not tea machinery in general I wish now to discuss. I have lately seen a new tea dryer, which has, I think, a great future before it, and a few words about it may interest some of your readers. Though I call it a "New Dryer," it has an old name, the "Sirocco," and hails also from Belfast. But it in no way resembles the old machine. Still we must not quarrel with Mr. Davidson for the name he gives his new child.

I never liked the siroccos (see my Tea Book*) I thought (and I was right) they had done good work in their day, but that improvements in other dryers had left them behind. When therefore Mr. Davidson asked me to come and see his new type of machine, I went, for I like to see everything connected with tea ; but I did not go thinking I should be much edified. I was much surprised. I found a virtually new machine which avoids all the faults of the old Sirocco ; they were—1, result in tea, far too little ; 2, burnt tea no rarity ; 3, tea dried partly by the heat given out from hot iron ; 4, the iron of the machine burnt ; 5, much of the heat escaped up the chimney, and was given out uselessly from the faces of the machine.

As I say, all these drawbacks are now done away with, and I feel sure the new type of Sirocco will be a favorite in Indian tea gardens. I should hold the same opinion had I alone seen it, for I spent many hours over it, and have studied tea machinery too many years to be easily misled. Still, I am glad to find my opinion corroborated by many who are well *au fait* of the necessities for dryers. During the one month it has been exhibited in Gracechurch-street, Mr. Davidson has sold between 60 and 70. It would take a couple of columns in your paper to describe the new Sirocco, and I cannot ask you for the space. I only wish here to call attention to it, for those of your readers who want to know more, will find two long articles of mine written last week in the *Tea Gazette*, in which all and everything about it is stated, and also why I think it is destined to prove a great benefit to the tea industry in India.

With 9 and 10 annas per lb., and sometimes less as an usual average for tea, the days are gone by for expensive machinery. Let it be ever so good, it won't pay to buy it. Excepting Mr. Davidson and one other, I do not think the inventors and vendors of tea dryers realise this stern fact. I do not see in some cases that those machines are any cheaper than formerly. But while Mr. Davidson certainly *does* sell cheaper than others, it may be partly owing to the fact that he *can* do so. Other inventors have to provide for the manufacturer's profits; not so Mr. Davidson, for he is his own manufacturer. Anyhow, there is no doubt his prices are low. The new Sirocco No. 3, turning out 10 maunds of Tea per day, is £90 complete, while the parts required to alter the old class of Siroccos, and make them of the new type, is £23 only. One great advantage achieved by Mr. Davidson is the fact that the many old Siroccos now throughout India can, at the above nominal cost, be altered into the new type.

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* *Tea Cultivation and Manufacture.* By Lieutenant-Colonel Edward Money (4th edition), Thacker, Spink and Co., Calcutta.

As the said new type has in it *all the requisites* to produce desirable and perfectly fired teas, I in no way doubt that it will do so. But as many of the machines will be very shortly in India, and will there be tested, let those who may doubt, wait and see for themselves.

I could say a good deal on tea machinery in general, which I think would interest such of your readers as "are in tea" (how many there are), but I must not tire you with this first letter.

EDWARD MONEY.

Editorial Notes.

We understand that two scholarships of Rs. 40 a month, tenable for three years, at the Saidapet Agricultural College, are to be offered to lads in British Burmah. This is a step in the right direction, for young men who have had the advantage of a scientific training in agriculture would be most useful there, where it is so very difficult to get the farmer to leave his accustomed groove. On their return they might be expected to turn their attention to some of the many products which could be as easily grown as paddy, and which would yield a still better return.

⁂

The report on the Bombay Stationery Department, for the year 1883-84 shows that—the Government orders to the contrary notwithstanding—a less amount of stores of Indian manufacture was issued than in the previous year. The actual difference in value amounted to Rs. 1,356. But the report contains a statement, showing that, even if these articles of Indian manufacture had been procured from England, there would have been a loss to the Government of Rs. 4,748, a fact which clearly proves the desirability of increasing the consumption of Indian manufactured articles as much as possible.

⁂

Some ingenious Borahs of Neriad and Kapadwanj are in trouble, and are likely to do penance for their ingenuity. They invented a novel kind of *ghee*, being a combination of *kubri*, or *kosamba* seed, and buffalo fat, so well assimilated as to present all the appearance and odour of *ghee*. As there was an appreciable difference in the price, in the way of cheapness, the ingenious inventors were doing a roaring business in it, until a short time ago the trick was discovered, much to the amazement and horror of a good many orthodox Hindoos who had thus partaken of buffalo fat. The matter is before the police authorities.

⁂

Travellers continue to leave Aden for the Galla country, where they say there is much wealth. Gold, it is asserted, is not estimated at its real value, and its weight in silver is readily received in exchange. Traders with the Soumali coast also state this to be a fact; but the Soumalis on the coast are less ignorant of its value; silver is their coinage, and silver ornaments only are worn. The last traveller to leave Aden was a very young Italian of noble family. He will enter the Galla country *via* Massowah, as he is doubtful as to the safety of the Assah or Obok route. He is rather nervous as to the success of his journey, notwithstanding that he has already had much experience as a traveller in the Soudan.

⁂

A writer in *St. James's Gazette* calls attention to the havoc which has been going on for so many years in the forests of every quarter of the globe; but no apology can be necessary for returning to a subject which must speedily compel the hearing now too generally denied. He says:—"The chief seat of the destruction is at present in the United States, where it has been long progressing at a rate which has often excited the fears even of the persons engaged in it." But some facts and figures just published in an American journal are of a kind which, combined with the manner of their statement, should surely have power to do more than raise an incredulous eyebrow. It is said that "the lumber industry will, in all probability, in the course of ten years or so, be transferred from the northern lake region to the south." Few persons will realize all that this matter-of-fact announcement implies; but it is, in reality, a comprehensive admission of the truth of the charges made against the lumbermen's practices. It means this: that the twenty years, which a short time since was the period allowed by the Lumbermen's Exchange in Chicago "for the exhaustion of the pine forests of their district," formed an unnecessarily liberal estimate. The statement means, moreover, that when the 146,000 hands now engaged in the business, have felled the last tree in the northern territory, they will be by no means content with the contemplation of their work. "The magnificent pineries of Michigan and other States in the lake region, are fast disappearing before the axe; but the whole south is a forest region, and when the northern lumber supply fails, the great saw-mills will be removed to the southern forests, and these will become the new centres of the industry."

⁂

There is a savour almost of brutality about this bare summary of the situation. No touch of regret softens either record or forecast; and that the latter will in due course be justified, there seems unhappily little reason to doubt. During seven months of the year 200,000 feet of lumber are daily sawn into planks in one mill in Ottawa, and there are over 25,000 such establishments at work in the country. It is obvious that not even the majestic areas of the American forests can long stand before such a terribly destructive force, exercised without judgment, and succeeded by no system that makes practical restitution to the soil. Of the results of this wholesale denudation there are already abundant signs. In the States chiefly affected, the volume of many of the tributary streams is lessened, droughts are frequent, and the productive qualities of the neighbouring farms seriously impaired. It was observed by Humboldt, that in the tropical regions an immense variety of trees live separately or "unsocially;" and it is clear that, owing to the immediate benefit reaped from them, trees thus situated are more jealously conserved than their woodland brethren. It is the province of forests beneficently to modify the climate of the adjacent plains, in the cultivated enclosures of which their loss is the most appreciable. Of the succour thus afforded there is, however, little general recognition—unless, indeed, by the forestry officers appointed by the Governments who systematically evade their representations. Many portions of Australia and New Zealand are also, in their turn, suffering from the multitude of "clearings" made by the early settlers, whose crude efforts may to some extent be condoned by the exigencies of their position. Even now, however, many colonial areas of cultivation—of which rather boastful accounts are given—are annually extended by their unconsidered destruction of the forests on which much of their ultimate fruitfulness must depend.

⁂

The "progress" of Florida has of late years been remarkable. This State contained in 1860 only 6,586 farms, a number which had risen to 23,438 in 1880. We are told that this indicates a large influx of farmers from other States; but it also "indicates" a wide levelling of the forests of oak and cedar, pine and hickory, for which Florida was once famous. The pampas of South America are also gradually falling under cultivation, and are here and there covered with crops of wheat and maize. Their permanent productiveness, however, will be greatly assisted by the maintenance of the bordering forests; a fact of which the Argentine Government appears to be quite exceptionally conscious. In Canada, on the contrary, the long indifference of the authorities to an average annual production of no less than 2,000,000,000 feet of lumber (broad measure), has been at last compelled to give place to anxiety; and the Dominion Government is now reserving large "blocks" of forest at the base of the Rocky

Mountains, lest the injury to the climate should become irreparable. From an interesting paper contributed by Sir George Birdwood, to the catalogue of the Indian Section of the Forestry Exhibition, it is apparent that, east and west, there has been a singular community of official apathy upon this subject. Of Afghanistan the writor declares that "a once fertile and wealthy country has thus been converted into an inhospitable desert." The Forest Department of India has happily been able to arrest, and in some degree repair, the ravages which up to some forty years ago had been going on for centuries in the forests of India and Burmah. The whole of Central Asia has more or less suffered from similar causes.

⁂

THE first report on the prospects of the wheat crop in the Central Provinces is as follows:—"Preliminary wheat forecasts as yet received from only six districts; but from them and from personal enquiry, it appears that, owing to continuousness of rainfall and its early cessation, there is a very general decrease of from 5 to 10 per cent in area; maximum decrease in Wardha, which is reported to be 32 per cent. The area has further been decreased in Chuttisgurh by extensive mortality of cattle; sowings have germinated strongly when effected early, but late sowings have come up unequally. Condition of crop is on the whole up to the average for this period, but rain is much needed, and if it occurs, an average out-turn may be expected."

⁂

THE first report on the prospects of the wheat crop in the Bombay Presidency is as follows:—"Reports not received from Dharwar, Khandesh, Nasik, Satara, Panchmahals, and Sindh. Ahmedabad,—Wheat area 265,624 acres, or 40 per cent more than last year owing to favourable late rains; seedlings germinating; young crops thriving. Ahmednugger,—244,071 acres, or 15 per cent less; in some parts area greater than in last year, in other parts decrease due to want of rain and smaller area devoted to wheat this year. Seeds have germinated in parts; crop good, in others they have withered on account of of rain and cloudy weather in November. Kaladgi,—128,662 acres. The crop will be, it is feared, a total failure for want of sufficient rain. Broach,—11,922 acres, or 55 per cent. more owing to injured cotton land having been re-sown with wheat; crop promising. Belgaum,—91,298 acres; sowings have not germinated in all places: crops in places good, in others withering. Poona,—80,000 acres, or 2 per cent less. Sowings germinated; crops thriving. Sholapore,—41,730 acres, or 20 per cent less owing to deficient rain-fall. Kaira,—29,781 acres, or 24 per cent more owing to late favourable rain-fall. Sowings germinated; crops progressing. Generally speaking, the area and condition of the wheat crop are satisfactory in the Guzerat districts; the crop area and condition in the Deccan and Kanarese districts are unsatisfactory from want of rain."

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A FRENCH Journal calls attention to M. Raoul Pictet, of Geneva, having introduced the use of sulphurous acid in combination with artificial cold, in the manufacture of wood pulp. Under the usual sulphite process the chopped wood is boiled for several days in closed vessels, with a solution of sulphite of lime or magnesia, ere the cellulose is separated from its surrounding constituents. But the cellulose resists a temperature lower than 180° Cent; accordingly the above boiling solutions are kept at a temperature of 150° to 160° Cent. and the resultant pulp is charred and blackened by the innumerable particles of carbon caused by the gums, resins, and other incasing materials of the cellulose being disintegrated whilst it is being boiled,—much subsequent washing and bleaching is consequently required to make the pulp a marketable material M. Pictet takes advantage of the fact that these alien matters may be disengaged from the cellulose at a temperature of only 80° Centigrade, and effects this at once by a concentrated solution of sulphurous acid and water, at the above temperature, along with a pressure of five atmospheres. The pulp is a beautiful white material; while the gums, resins, and other material may be subsequently recovered [illegible] the lye-wash, and utilized in the arts.

LEHNER publishes the following formula for making a liquid paste or glue, from starch and acid:—Place five pounds of potato starch in six pounds of water, and add one quarter pound of pure nitric acid. Keep it in a warm place, stirring frequently for forty-eight hours. Then boil the mixture until it forms a thick and translucent substance. Dilute with water, if necessary, and filter through a thick cloth. At the same time another paste is made from sugar and gum arabic. Dissolve five pounds gum arabic and one pound of sugar in five pounds of water, and add one ounce of nitric acid and heat to boiling. Then mix the above with the starch paste. The resultant paste is liquid, does not mould, and dries on paper with a gloss. It is useful for labels, wrappers, and fine bookbinder's use. Dry pocket glue is made from twelve parts of glue and five parts of sugar. The glue is boiled until entirely dissolved, the sugar dissolved in the hot glue, and the mass evaporated until it hardens on cooling. The bard substance dissolves rapidly in lukewarm water, and is an excellent glue for use on paper.

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A CONTEMPORARY lately brought to the notice of the public that a paper mill has been established in Shanghai. We are now told that the investment promises to be a success. All requisites are to be obtained without any difficulty, a plentiful supply of water, an abundance of raw material to work with, cheap manual labour, cheap motive power, and a capital market to dispose of the manufactured article. It is now close upon ten years that the enterprise was introduced into Japan by a Mr. Doyle, and since then a dozen mills are in full working order there. Those which have been properly constructed, and placed under efficient and skilled management, have been exceptionally successful; the mill at Osaka cleared itself in three years; while the one at Oji paid a dividend last year of 17 per cent on stock amounting to 565,000 dollars. The other mills were not quite so successful; but no failure has been recorded, and what is more, the entire enterprise of paper manufacture in Japan is now in the hands of the natives of the country, who have so far advanced in the art as to think themselves justified in being independent of foreign supervision. An interesting feature in connection with the paper trade of Japan is, that while nine or ten mills have been working successfully, the importations of foreign-made paper have considerably increased—more than doubled—during the last few years.

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THE following paragraphs are taken from a highly interesting paper on sugar bounties, in the *Fortnightly Review* for November 1884, by George Baden-Powell, C.M.G. There must be backbone in a grievance which commands not only space for days and weeks in the columns of the *Times*, but also notice and attention in every leading journal. In the face, however, of papers presented to Parliament, leaders in all newspapers, and voluminous correspondence, official and unofficial, public and private, there still remain three or four points which I put forward in this article, as they contain the gist of the whole grievance, as well as the only practicable remedy. I state them in summary at the end of the article. Why they have not as yet obtained due prominence in the controversy is because side issues have monopolised all attention. Everyone who has looked into the question acknowledges there is evil somewhat. From Secretaries of State, downwards, there is a general and decided, although strongly undefined, conviction, that the bounty system is on the whole an evil system, and should be put an end to. Popular definitions of the evil coincide in declaring that bounties have brought about such an artificial lowering of the prices of raw and refined sugar, that sugar producers and refiners can no longer produce or refine except at a dead loss, and the public refuse to pay heed to any remedy except that of a countervailing duty. I venture to say that this generally-accepted definition of the evil is both inadequate and inaccurate, and that the popular remedy declared by those in authority, to be impracticable and ineffectual, is by no means the only remedy.

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IT would be well to recall, in [illegible]line, the arguments [illegible] have been advanced on either side. The West Indi[illegible] have put their case very strongly—pointing out the great value of the West India sugar industry; its paramount importance to the prosperity, or indeed the very life of those colonies; the ruin and starvation which would follow on its destruction; and the responsibility which rests upon England, as the paramount power, to act effectually in defence of West Indian interests, or to bear the consequences and costs of inaction. In addition to this, they point out that the production of beet-sugar has, roughly speaking, trebled in amount, while that of cane-sugar has done little more than hold its own; all of which they attribute directly to bounties; and, having thus made their definition of the evil, they proceed to advocate, as a remedy, a countervailing duty. English refiners tell the public distinctly that bounties on refined sugar lessen by so much the price in the English market, and so not only rob them of legitimate profits, but force them to sell at a loss or accept absolute ruin. They also point out that so long as the bounty system is possible, there is absolute and hurtful uncertainty in the whole trade. Nor do they scruple to warn other trades and industries that if the system be allowed, and not stigmatized as contrary to the true spirit of international comity and intercourse, bounties may at any moment upset any other trade or industry. When the right time comes the Chancellor of the Exchequer will discover a very material falling off in the returns from the Income Tax, and he will find this to be largely due to the fact that all connected with sugar—planters, manufacturers of machinery, refiners, merchants, and brokers—are now making no nett incomes. The amount so lost to the revenue will have to be made good by the nation in the capacity of tax-payers, and this loss of income will be found to be no adequate set-off against the advantages it obtains from bounties, in its capacity of consumer.

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Against these trade grievances the Board of Trade puts forward elaborate rejoinders. These show that many of the statements made in support of the grievances are founded on a misapprehension of facts; in some cases this modifies rather than destroys the grounds of their grievances. West Indian planters are asked to remember that quite as serious anticipations of absolute ruin have before now been falsified by the event. This is, of course, an appeal to the future, but West Indians have this argument on their side, that there is a minimum cost at which sugar can be grown, and that prices never before falling below 17*s*. have in this crisis fallen to 11*s*., and that there is thus a new danger of that minimum being passed. These rejoinders also give cold comfort in pointing out that other trades have survived crises even of greater severity; and they enumerate the advantages these low prices have been to many manufacturing industries, as well as to the consumer generally. The Board of Trade comes to the general conclusion that the alleged fall in prices would mean, that the people of the United Kingdom pay annually £5,000,000 less for their sugar; but it is also pointed out that the total amount of bounties obtained cannot exceed £2,000,000. The Board of Trade now acknowledges bounties do evil on the whole, and confesses it "would wish to see an end put to them," but that "it would not pay to get rid of them at any price," particularly if that price included the adoption by England of retrograde measures savouring of protection; and this leads them to their main argument and conclusion—that they cannot recommend Government to take any action, seeing that the remedy proposed—namely, the imposition of a countervailing duty—is not only contrary to true free-trade principles, but for a variety of reasons, impossible of application.

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Such are the chief arguments on either side, but they do not go to the bottom of things. There is a great and grave discrepancy, for instance, between the £5,000.000 England is supposed to save in its annual expenditure on sugar, and the £2,000,000 of that amount which is contributed by the foreign tax-payers. How is this £3,000,600 to be accounted for? Is it paid out of English profits? There has been a great and general fall in the price of sugar, far and away above any fall [illegible] attributable to bounties. The primary question is, [illegible] caused this fall?

We are too apt in regard to food, to measure consumption, for statistical purposes, by records of production. We do not do this in iron or piece-goods. But directly we deal with wheat or sugar we take an estimate of home productions not exported, and add to this the imports, divide by heads of population, and write homilies on "the movements of consumption." The general public is thus misled altogether in cases of over-production; and no notice is paid to the fact that oftentimes there is more food in stock than the day-to-day demand needs. This is undoubtedly the state of the case in regard to sugar just now. There is production altogether in excess of demand. All over the world, in recent years, a very remarkable impetus has been given to the production of sugar. Cane-growing, at one time almost a monopoly of the West Indies, has developed largely in North and South America, in Natal, in Mauritius, in Australia, in Fiji, and, above all, in India, Java, and the East generally—not even forgetting hapless Egypt. It is, of course, to be noticed that concurrently with this great development of production, there have grown up in North America and in Australia, great new communities of sugar-eating Anglo-Saxons, and that these new markets call for new areas of supply. But even these numbers by no means account for the enormous increase in out-put. For instance, if we take England, we find a very remarkable increase in the local consumption of sugar, altogether out of proportion to mere increase of population. The sugar used per head of population has increased from 15lbs. in 1840, to 64lbs. in 1880. It is perfectly obvious that people do not eat and drink now more than four times as much sugar as they did in 1840, or twice as much as they did twenty years ago. These figures show that the quantity "used" must be accounted for, not by increased consumption, pure and simple, but by the fact that we use more sugar in various manufactures—such as distilling and the making of wine, jam, beer, soap, ærated waters, and even varnish, boot-blacking, and druggets. In some cases more sugar is used because of increase in out-put of the article manufactured; but in others sugar merely supplants other raw materials. One great cause of this increased use of sugar is its low price, and its low price is due to the extension of production, regardless of all demands of food consumption. But it must be asked, why has production increased so rapidly and so determinedly, in the face of falling prices and increasing profits? It must suffice here to state that there has been a natural development of cane-growing, to supply the natural increase in the normal consumption of sugar as a food; but there has been a great abnormal increase in the production of sugar from beet-root, due not to any legitimate demand, but to the bounties which represent, at present prices, an advantage of 30 per cent on the beet sugar exported, and of 10 per cent on the total produced. We have proof in the fact, that in the last three years in Austria, bounties were stopped, and the out-put fell 17 per cent; in France, reduced, and it rose only 27 per cent; in Germany, maintained high, and it rose over 48 per cent.

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All the world knows that no Continental Government gives bounties, but that the duties are levied on the beet or juice as it goes into the factory, on calculations of the average amount of sugar that should be extracted. The average has to be calculated on previous knowledge, and the manufacturers, applying new devices, easily exceed the old averages. On exporting this sugar they receive a drawback as if duty had been paid on all of it. It is also undoubted that much fraud is practised. For instance, a Belgian fabricant confessed, that he "pressed" his roots in the presence of the Government official, and paid on the juice then and there extracted; but he "pressed" lightly, and when the official work and record was over for the day, the roots were again pressed in private, and found still to contain a large amount of juice, on which no duty was paid, although a drawback was subsequently obtained on the sugar made out of it. Also, in many cases, a drawback is obtained on sugar made out of molasses on which no duty had been paid. Again, instances are far too common, of gross and [illegible] adulteration of the finished article, earthy and vegetable matters obtaining drawbacks, as if pure sugar. Altogether, fabricants and refiners manage to create a large margin of "sugar," on which they obtain a drawback, although it has never paid duty. It may not be out of place to explain the case by an illustration. In round figures the "fabricant" pays £6 on every 10 tons of beet that he uses, on the understanding that out of this he will make 1 ton of sugar. But by improved processes and other means he turns out 1½ tons. If in the year he works 10,000 tons of beet he pays £6,000 in duty, and turns out 1,500 tons of sugar. If he exports this he receives from Government a drawback, the equivalent of the duty, of £6 per ton, or, in other words, £9,000. The tax-payer provides him with £3,000 per annum for every 1,500 tons of sugar. It is thus obvious that he can carry on his industry at a profit, even though his sugar costs more to produce than cane sugar, by 20*s.*, 25*s.*, 30*s.*, or even 35*s.* per ton.

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THUS this bounty system, *without any reference to prices*, has led to an enormous expansion of production, altogether unwarranted by the demands of consumption or the gains of legitimate competition. The bounties directly stimulate over-production for export, but at the same time it is necessary that they be accompanied by high excise duties, sur-taxes, and import duties, and thus check not only local consumption but importation also. The result is over-production of a wholly injurious kind leading to glut of neutral markets.

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THE rejoinder has often been made—and the Board of Trade places it in a prominent position—that it is of great advantage to England thus to obtain at exceedingly cheap rates what is widely consumed as a food, and what is more and more becoming a raw material of several industries. This is incontestable; but the question remains, at what cost do we obtain this undoubted advantage? The falling off in the yield of the tax on sugar incomes would tell us some of the profits the nation has to forego in order to secure the £5,000,000 advantage. These alone may be found to exceed it. Such losses result partly from the ruinous uncertainty caused by the very existence of so arbitrary an interference with prices. This checks investment in the industries concerned, and also forces those already engaged in them to demand higher present profits in view of the uncertain future. Other evil consequences are the checks placed on the legitimate expansion of the industry, and the actual destruction of capital invested: when, for instance, a plantation or a refinery has to be thrown out of work. The evil effects extend to other trades, not only those more directly concerned, as the making of machinery or the carrying trades, but even to the general export trade of the country, because the people who provide the bounties have, to that extent, less money wherewith to make purchases. These are some of the evil effects that represent the cost to England of this advantage of £5,000,000 per annum, but there remains one general effect which has not yet received the attention which it undoubtedly merits: owing to the bounty system many *in England are compelled to use that sugar which it costs most to produce.*

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THE task has not yet been definitely undertaken of discovering what is the actual average cost of the production of beet and cane sugar respectively. Nevertheless, such information would be of the highest value and point. I have visited various cane-growing countries, and taken every opportunity of going over estates, and discussing matters with owners, managers, and workmen. I always told my object, but also explained I should never divulge information which was, after all, their own property. I have thus obtained a fairly accurate estimate of the cost of production of cane sugar. This varies greatly with the circumstances of each estate, and especially with the kind of sugar made, but I claim to know, with sufficient accuracy, for political purposes, what it costs on the average to produce the leading types of cane sug[illegible]

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It was a far more difficult matter in regard to beet [illegible] but I am much surprised at the results of a great deal of evidence I have gathered. It would be of the [illegible] advantage if full evidence on this subject could be acquired. I commend this task to the Board of Trade, as a fit and useful subject of inquiry and report, by our Diplomatic and consular staffs abroad. The conclusions at which I arrived, and which may properly and profitably be made public property, are that cane-sugar can be, and already is, produced at less cost than beet sugar. This latter is now produced with a perfection of process which it seems certain cannot be materially improved upon, but this is not the case with the bulk of cane-sugar. Nevertheless, even under present conditions, so far as I can learn, cane-sugar, is produced at a cost less by some shillings the cwt. than beet sugar. I therefore hold, after due inquiry, that in so far as the bounty system compels the use of beet sugar, in so far it *compels the use of that sugar which it costs most to produce*; and I ask can there be a balance of good in this?

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WE have thus arrived at two new points in this attempt to define the evil. In the first place, the present low prices of sugar have been largely caused by an over-production directly traceable to bounties; and, in the second place, this over-production is likely to continue so long as Continental growers can prevail on their Governments to make up to them any losses out of the uncomplaining pockets of ignorant tax-payers. All this is, on the whole, injurious to England; it also does great injury to the nations which allow bounties.

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IT is perhaps one of the main distinctions between English and Continental history, that in our island the tax-payer has always exercised his voice with effect, whereas this has not been the case in any single Continental nation. We may be insular in our notions; we may be despicable as shop-keepers; but we seem to have for centuries ingrained in our dispositions a jealous and close care of the family till. Ever since money became a medium of exchange, and services to the State became convertible into money payments, there has developed in our midst a prerogative, not only claimed but exercised by every individual, to make no such sacrifice except of his own free will. It is true we "freely grant" a national revenue of a most liberal character—we give £20,000,000 when we abolish slavery, and we do not hold our hands to rescue captive missionaries in Abyssinia or send relief to Gordon—but it is all done with the conscious consent of the individuals who contribute the revenue. It is this national idea which lies at the root of our commercial prosperity. But on the Continent we look in vain for the voice of the tax-payer. Statesmen nominally have it all their own way, but in reality—in some cases consciously, and in others not—they are twisted round the little fingers of vested interests or selfish schemers.

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WE have to thank Mr. C. S. Bayley, C.S., Under-Secretary to the Government of India, in the Revenue and Agricultural Department, for the following valuable note by Assistant Surgeon Abdul Rahim Hakim, Khan Bahadoor, Assistant to the Political Resident, Persian Gulf, on the subject of the care and culture of date trees and fruit:—In districts where date plantations are large and on extensive scales, the cultivators do not think seriously of the comparatively small loss, caused by the depredations of wasps, sparrows, crows, bulbuls, &c., on the sweet date fruit while forming on the palm, and as a rule do not provide against sugar-loving insects and birds, and grudge them not a share of the fruit. They say that in the good old times the cultivators were more liberal-minded, when the export trade of the date to European countries and America did not exist, and those countries had not acquired a taste for this fruit; that then any number of strangers could go to a plantation, and treat themselves *ad libitum*, to any quantity of date fruit they liked, without objection. But times have changed. The demand for the fruit having largely increased, it is more taken care of, and strangers are not allowed to indulge in those liberties.

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[illegible] that all this apparent [illegible] to the encroachments of the aforesaid creatures [illegible] solely attributed to their alleged magnanimity and charitable feelings for them—at least in these days when the fruit has a market value ; but that their indolence and the actual difficulty, perhaps costliness, of the measures to provide against these inroads must explain a great deal. The ordinary wants of these people are few and simple ; they are satisfied with what little they get, and are content to live on the same : as a result their inventive faculties are not taxed for devising means against such sources of loss, which certainly cannot be considered of no moment. But if the case was otherwise, and the struggle for life was as great as in European countries, protective measures would doubtless be fast forthcoming, simply because "necessity is the mother of invention." In places where the date palms are few, and some choice dates are concerned, the date bunch is put into a gunny bag and the mouth of the bag closed up and tied securely at the lower part of the date spadix, to prevent the depredations of those insects and birds. At Bustak, Gowda, Jenna, and other inland districts on the Persian mainland, where dry hot winds prevail, the cultivators allow the fruit to ripen and dry on the palm, and with a view to protect it from the injurious effects of very dry and hot winds, as soon as the date has become sweet, but before it has commenced to soften and become juicy, they wrap up the whole bunch, the stalk of which being already sufficiently bent down for purposes of easy manipulation, in the leafy twigs of a perennial bush called "salm," and, securely tying the leafy covering, leave the bunch until it is finally cut down when the date has ripened and formed. This method gives also a good deal of protection against the inroads of birds and wasps.

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In some districts, as those of Minab, sometimes bears prove destructive to the fruit ; but the cultivator effectually provides against their climbing up by tying a quantity of some thorny bush or twigs of samr (thorny acacia) or koona (zyzyphus) around the stem of the palm, at some height from the ground. Against a flight of locusts he is perfectly helpless ; all his attempts at driving them away, by beating about among the palms with dry date leaves, and agitating them to cause a rustling noise, &c., and his burning quantities of hay, tamarisk branches, and other rubbish to create smoke, prove of little or no avail ; as, when the locusts alight and squat, they completely devour the fruit and leave the palm, in a short space of time, divested of its leafy appendages. There are two principal forms in which the date fruit is cured and prepared for commercial purposes,—*viz.* (1), "khoorma," soft and juicy ; (2), "kharak-pokhta," dry and firm.

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The following is the usual mode adopted for preparing "khoorma" for commercial purposes :—As soon as the dates become ripe and juicy, they are picked off the tree and gathered into a round chunam tank called "madibsah," where they are exposed to the sun and air, and throw off the excess of juice which runs through the aperture at the bottom of the madibsah, and collects in a separate jar buried underground to receive it. After two or three days exposure, when the date has sufficiently hardened and formed, it is removed, and packed in date-leaf baskets for exportation. Sometimes, when the owner does not find a ready purchaser, he stores the date baskets in a close-plastered room called "kandool" in piles of 15 to 20 baskets; the floor is furnished with channels which convey the juice thrown off under the mutual pressure of the bags, to a large jar buried underground. Sometimes the juice is slow in draining, then the cultivator encourages the flow by pouring a little warm water on the dates while they are in the madibsah. But the dates thus treated and forced to give up their juice lose their taste and commercial value, and are not so much esteemed as those which are simply dried.

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The best method for curing dates is the following :—The fruit, as soon as it has become "ratab," *i.e.*, ripe and juicy, is picked off the bunch, and spread in an enclosed plot of ground called "mustah," which is previously well [illegible] render it firm, and sweeped clean to prevent [illegible] from mixing up with the dates ; or, better still, they are exposed to dry on date jowlies spread within the "mustah" from three to five days, and then collected and packed in baskets.

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The following are principal varieties of dates which are cured in the above method :—*At Busrah and Mohammerah.*—Guntar ; Khadrawi ; Hallowi ; Baraim ; Dairee ; Shakar ; Sa'ameran ; Kabkab ; Zahidee Sayer. Sometimes small quantities of the following dates which are rare, and usually consumed in the fresh Kharak stage, are mixed with the above :—Barhee ; Jowzi ; Loolooi ; Khassab ; Hamrawi ; Firsee ; Shirsi ; Asgar, &c. *At Dashti.*—Seesee ; Khanaizee ; Zynadheoni ; Kasp ; Kabkab ; Kandi ; Shakar ; Guntar ; Hallowi ; Muktoom, Shaikali ; Kharoo ; Sheereeni ; Jowzi ; Shahooni ; Kaidi ; Rash, &c., &c. *At Batineh and 'Oman Coast.*—Musalla ; Salani ; Khanaizi ; Hilali ; Khassab ; Maisali (principally made into Kharak) ; Barani ; Sarashi ; Maznaj ; Fardh ; Khamri ; Naghal ; Khalas ; Abunaranjah, &c. *At El Hasa, Kateef, and Bahrain.*—Khalas ; Khanaizi ; Marzaban ; Hilali ; Khassab, &c. *At Minab, Bunder Abbass, and Shamilat.*—Khanaizi ; Murdasang ; Hilali ; Marzaban ; Azad ; Zarrak ; Sahkari ; Abdandan ; Mandal ; Kalak Soorkh ; Malak Soorkh ; Shaikh Kamali ; Dang-Safeed ; Chattan ; Hallow ; Ali-mehtari ; Soorkh-dang ; Mosalli ; Mosalla ; Naghal ; Shahri Sa'ameran, &c., &c. There are other varieties not well known, and are comprised under the general term "Kharoo."

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At El Hasa the best dates, principally Khalas, are packed in skins of 70 to 120 pounds for export. So also at Busrah, dates are packed in skins ; the dates are picked for the purpose ; the skins are then allowed to dry in the sun, and covered with gunny. At Bahrain and Kateef, Khalas and other dates of superior quality are put in small earthen jars, and rendered palatable by adding to them small quantities of sesame seeds and ginger powder ; the jars are then sewn up in the date-leaf matting.

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Now, since the European and American firms have commenced to send dates to their own countries, they have adopted the system of packing the best dates—*i.e.*, Hallowi, Khadrawi, Zahedi, and Sayer—in deal boxes of various shapes and sizes, brought ready made from those countries. The average size of a box is about 45 pounds net weight. Hallowi dates are also carefully packed in small card-board boxes, 10 to 15 of which are then put in a large deal box, which is then nailed over. The best dried dates of sound skin, and specially those which are allowed to dry on the palm, are carefully picked by a large number of labourers, principally women, boys, and girls, employed for the purpose. A certain weight of dates so picked intended to go in a box is taken ; the dates are then carefully placed, one by one, in rows, so as to form layers in the box, which is lined with paper, and eventually nailed and ready for export. Some people put hoops round the boxes, and cover them with gunny, while others do not. These layers are pressed down three or four times during the filling of each box. The dates packed in boxes in layers throughout have now the best repute in the market. Small quantities of dates have lately been shipped from Busrah in fancy baskets, but on account of the heavy freight, no sanguine hopes are entertained of this method proving a success. Hallowis keep best, but Zahidis are the brightest in colour, but soon get wormy and spoiled.

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The cultivator has other modes of curing fresh dates and making preserves of them in small quantities for his personal use, and for presents to his friends, and even for sale to a small extent. "Khoorma-Sheerah" is generally made of Murda-sang and Khanaizi dates. The best dates are culled and further well dried in the sun, exposed on mats or date jowlies, and protected during nights from dews. They are then washed with diluted date juice of all [illegible] &c., and put in a jar mixed with sesame [illegible], walnut kernel, &c. ; a quantity of good date juice [illegible] poured in so as to cover the whole. This is much prised by the natives. "Khoorma Seli-Roza," so named from its being [illegible] to be [illegible] third day of its being potted. It is a rare an special preparation made at Minab from the Hilali dates. The fresh "ratab" is taken, its skin is removed by the date-leaf spine; then the coarser but soft layer of the pulp; finally, the white firm pulp which is left round the stone is further detached, and collected in small earthen pots. The mass is rendered more palatable by adding to it a quantity of pistachio and almonds &c. This is considered a great delicacy. "Khoorma Post-kandah," the skinned date.—This can be prepared from all the good varieties of dates, but it is generally made from the Hilali. As above, the skin of the fresh "ratab" is removed by the date spine; the stone is pushed out by the same; the fleshy part is gathered, and packed in large earthen pots. "Moorabba Khoorma" (date preserve).—The ripe "Kharak of Hilali," *i.e.*, before they have become "ratab" (soft and juicy), are taken; portions from both ends are sliced off: they are then deeply punctured all over by the date spine and well dried in the sun. The stone is sometimes replaced by almond or pistachio. The "Kharak" thus treated is boiled in sugar syrup to a sufficient consistence, and forms an excellent preserve, and may be bottled and kept for any length of time. "Matgoogah."—The sweet and fresh "Kharak" is broken up and dried in the sun for five or six days. It is then pounded in a wooden mortar; the powder is put in boiling date juice, and mixed with sesame seeds and flavoured with cardamoms, cinnamon, &c. The whole mass is then well stirred while boiling, and removed from the fire, and further well mixed up, and finally put in jars for use.

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The second form in which the date fruit is cured for commercial pusposes is the "Kharak-pookhtah," the boiled date. It is prepared as follows:—When the "Kharak" has become sweet, but before it has begun to soften, the spadix, with its load of dates, is cut off from the palm and immersed in larger copper pots of boiling water, in which it is allowed to remain for a time, which is decided by the man engaged to do the work. It is stated that the boiling is continued until the stone assumes a reddish colour; when the bunches are removed and exposed to dry in sun on mats for eight or ten days; they are then detached from the spadix, allowed to dry further, and finally put in bags for export.

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The fruit of all the varieties of the date palm can thus be converted to "Kharak-pookhtah," which is dry, firm, and even hard, and does not relish so much as the "Khoorma," which is soft and juicy. This may perhaps account for the small quantity of "Kharak" usually prepared. At Busrah, "Kharak-pookhtah" is prepared in small quantities from Baraim, Sa'Ameran, Kabkab, Maktoom, and Shakar. Baraim yields the best quality, and is said to be wholly converted into Kharak, as it does not ripen beyond the "Kharak" stage, its price being two or three times more than that of Sa'Ameran Kharak, which is also abundant. The best "Kharak-pookhtah" of Minab is from Hallowi in small quantity, but principally from Zarak and Sayer. At Lar and its neighbourhood a "Kharak-pookhtah" is obtained from the Sha-Khani date. As soon as the fresh Kharak has been sufficiently boiled, it is taken out of the water, its stone removed, and it is strung in long wreaths and hung up to dry; it is yellow, and of good taste. From various causes a portion of the date-fruit does not attain maturity, and generally drops off in a half-ripe state; becomes dry, skinny, with very little flesh. In this condition it is called "Salang," and used as food for sheep and domestic cattle; sometimes it is boiled with date stones, and constitutes a nutritious food to the milch-cow.

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The age of an off-shoot is no reliable guide for its being detached from its parent for purposes of a successful transplantation. An offshoot sometimes continues at the foot of its parent several years, but under the various unfavourable circumstances of soil, supply of water, &c., it is small and weak, and therefore unfit for transplantation; while under favourable [illegible]stances an offshoot, 3 or 4 years old, is vigorous and large, and does not usually, when transplanted, [illegible]ke root and survive. Hence the vigour of growth and the actual size of the young plant are taken into consideration. The average weight of the young plant most suitable for purposes of transplantation is considered to be six pounds; but larger weights are preferred, as, after striking, the plant grows rapidly, and bears fruit without much trouble and expense to the cultivator. It is averred that sometimes offshoots which have commenced to bear fruit are carefully detached and successfully transplanted. The *Phœnix dactylifera*, or the Arabian date palm being diœcious,—*i.e.*, the male and female flowers existing on separate plants,—the conveyance of the pollen to the female flowers is essential to fertilisation and formation of the date fruit. The agency of winds and various nectar-loving flies and insects does not seem to be sufficient to effect the necessary fecundation, as in such cases, the fruit yielded is stated to become abortive or blighted, with little flesh, without stone, and totally insipid, and is termed "Shis." Consequently, human agency is considered essential for a fruitful impregnation.

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The male spathe, as soon as it has attained its full size and maturity, which is known to the cultivator by certain signs and indications, such as a faint rustling sound, elicited when the central part of the spathe is gently pressed, or a peculiar seminal odour, detected by making a slight indentation in the marginal part of the spathe, so as to expose the flower, which is cut at its root and taken down. The enclosing spathe is slit open, and the flower-sprigs are gently detached from the spadix, and carefully preserved in a basket, which is suspended in a spot protected from drafts of wind; the sprigs are allowed to dry for 20 to 24 hours before being used.

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As soon as the female flowers have split open the spathe under their growing pressure, the cultivator considers it time to commence the operation of fertilisation. He takes the flower-twigs of the male palm, and deposits one or two in each bunch of the female blossom, lightly binding it up with a strip of date leaf. If the cultivator finds that some of the larger spathes have not split, to save him the trouble of reclimbing, he slits them open and deposits the flower-sprigs in the blossom, as before. Only very small ones he leaves untouched, to be attended to, if necessary, subsequently, when they have attained maturity. But, as a rule, he does not allow all the flower-spathes, which vary from 12 to 24, to remain on the palm and form fruit, because by doing so the fruit becomes small and degenerate, and during the next year the yield of the fruit is lessened. According to the vigour of the palm, which he knows by experience, he leaves 8 to 12 bunches to form fruit. The excess is removed and consumed by his people and friends. The sprigs of the male flower are preserved in a dry form one or two months, and used as occasion demands. They are, however, before being used, slightly moistened with water to prevent the pollen from being scattered and blown away by the wind. It is stated that sometimes, when the male flower is not in sufficient quantity at "Kharg," the cultivators import it from Busrah. Pollen of one year cannot, it is stated, be preserved for use during the next year, as it becomes spoiled. When the female blossom has thus been treated with pollen, the supply of water is cut off for a time, varying from one and-a-half to two months, as excess of water is said to be detrimental to a proper fertilisation. The general method adapted for cultivating the date palm in these parts, where it is grown for economic and commercial purposes, is that it is planted in extensive groves for facilities of tending them and collecting the fruit. Spots are selected where abundance of water is available in shape of river, spring, "kanat," or well water; in other places where water from wells is scanty, such spots are selected as can be irrigated by rain-torrents during the rainy season.

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A plot of ground is selected according to the number of palms which it is intended to plant in a grove, which may consist of 80 to 150 or 200 palms, planted in regular rows, with a distance of 12 to 15 feet between them. The grove is surrounded by a high "bund" for purposes of admitting and retaining water in the grove, and generally regulating its irrigation, being provided with inlets and outlets to admit and get rid of excess of water, especially that from rain-torrents. For the first two or three months, after the offshoots have been planted, they are watered, each separately, by water carried to them in pots; great care is taken that no mud gets into the heart or crown of the young plant, as it proves destructive to it. After the plants have struck root they are watered once a week, a fortnight, or a longer interval is allowed to elapse, but it is essential that they must be well watered once month. When they have grown up and have attained some age, they are watered once a month during the hot months only. At Busrah, where water is abundant from the river, deep and wide trenches are dug between the rows of the palms, and filled with water. But where water is scanty it is allowed to run down in small channels to the foot of each palm, the ground being previously well dug up, loosened, and turned over to allow of its thorough saturation.

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VEGETABLES, lucerne, &c., are grown, as at Bahrain, in these groves, such a cultivation being considered highly beneficial in improving the soil. With this object also the soil is ploughed and turned over once a year to render it soft, porous, and permeable to air moisture. In places which border the sea, fins of awal or lookhm, a species of ray-fish, are used for purposes of manuring the palm; two or three bits are buried at the foot of each palm, and it is regularly watered once or twice a week until the whole is absorbed and disappears; or these fins are put in, and allowed to macerate in the tank of water which feeds the plantation, and the palms are regularly fed by water so impregnated. In other places where this is not available, the dung of the cow, sheep, and goats, &c., and surface sweepings are used.

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THE best spot for extensive date plantations would be, as at Busrah, Mohammerah, and Minab, along the river banks abounding in alluvial soil. Excess of water generally is said to spoil the date fruit, and if the plantations become flooded and continue so any length of time by any very unusual rise of river waters, not only is the fruit damaged, but the palms have been known to die. So also damp air, when the fruit is forming, is said to be prejudicial, as a great deal of it drops off in a green state; this green date is called "Khamal," and is given to sheep and cattle, but the poor people consume it with fish. Moderately dry winds are said to be very beneficial. To secure a vigorous growth to the palm, as also to obtain materials for economic purposes, the following points require to be attended to. As the date palm grows each year the lower whorls of the leafy stalks, as their vitality diminishes and they become dry, are chopped off; the long stalks called "Goory" are made into jowlies for covering sheds, roofs of houses, and various economic purposes. Their lower thick ends, called "tapool," are used for fuel, but those which are broad and light are used as floats for fish-nets.

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THE flower spadix and its spathe must also be removed. The green spadix, when well beaten with billets of wood, yields a quantity of fibre useful for rope-making. In a dry state it is used as fuel, but if allowed to macerate and soften in water on being pounded between billets of wood, yields fibres for ropes. From the fresh spathe, called "Tara," is obtained the "Tara" water, by distillation. It is of a strong but agreeable smell, and is prepared at Busrah and Bahrain; sold in carboys at one-and-a-half to two rupees each. It is made into a sherbet, and is greatly prized by the Arabs and Persians. The young offshoots sprouting at the base of the palm, if they are not intended for transplantation, must be removed in the spring of each year, as they prevent it from thriving. In the same way the buds, which sometimes form and grow from the crown of the palm, resembling the offshoots at the base, must also be pulled away, as they weaken the palm. These buds are sometimes said to have grown and yielded fruit whe[illegible] to grow on the palm.

EXPERIMENTAL CULTIVATION OF THE NATURAL KHAKIE-COLOURED COTTON.

SOME very interesting experiments have been made with the seeds of this cotton in several of the districts of Bengal, which have just been published by order of the local Government. In the district of Bankoora the seed was sown in the Collector's garden. It germinated in the course of time, and the plants, while 2½ feet high, yielded a few pods like ordinary cotton, in the month of February 1884. The plants were allowed to grow on and are now four feet high. They are expected to bear again next month. In the district of Hooghly the seeds were distributed to five wealthy zemindars, and it is curious to note what varied results attended the sowings within a radius of a few miles. In Ootterparah, a small village six miles from Howrah, three experiments were tried. In one instance the plants gave promise of healthy growth, but after they were about six inches high they decayed and died out. In another instance some cotton was grown, but it is reported that owing to the moist character of the soil of this part of the country, the stalks do not grow large, and the colour of the cotton is affected. In the third case the plants came up to a height of about a foot, but soon after died out. In Jonai, the quantity of cotton produced in 1883, was small, due to late sowing, but the quality was fine. Some seeds were sown in 1884, and the luxuriant growth of the plant promises a good out-turn. One of the zemindars caused some seeds to be sown in his estate in the district of Rungpore, out of which only three plants have grown to a height of eight or nine feet, but not an ounce of cotton has been recovered. A piece of cloth and some of the yarn worked up from the Khakie-coloured cotton, by the officer in charge of the Hooghly Jail, have been forwarded to the local Government for inspection; another piece of cloth has been retained in the jail, when the fastness of its colour will be thoroughly tested. There was a complete failure in the Chittagong Division where the seeds were sown both in *jooms*, and in lands duly ploughed and prepared. The seeds germinated in every case, but the plants gradually died out. The failure, however, is easily accounted for; the ordinary cotton is sown in the district in April and May. The seeds in question having reached the Deputy Commissioner in July, it was too late to undertake the experiment with any hope of success. A fresh trial will be made this summer. In Monghyr, the plants which grew in General Murray's garden last year were nearly all eaten up by insects, and a few pods of the last season have been sent as specimens for inspection. The new plants are 11 months old and in a flourishing condition A large out-turn is anticipated. A quantity of nine seers and five and-a-half chittacks of cotton was produced from plants which grew, from a quarter of a pound of the seed sown in Maharaja Shew Prosad Sing's estate. The plant is not new to the district.

In the district of Bhagulpore a few seeds were sown in August 1883, in the sub-division of Soopole, which germinated freely; but the plants were eaten up by insects. Finally the bulk of the seed was sown in October, but owing to untimely cessation of the rains in September, they did not germinate, and the few that did come out died from want of moisture. The Collector has received a quantity of the seed from Cawnpore for further trial. Baboo Hari Mohun Thakoor made the experiment in his own garden, the soil of which is believed to be suitable for the cultivation. The plants there are in good condition, and beginning to flower. In the Southal Pergunnahs, a quarter pound of the seed was sown at each of the two places, Jamtara and Godda. The Deputy Commissioner says, "the seed was very old, and only about one-third germinated. Some of the produce was of a very dark colour, some white, and some light."

In the Orissa Division, the crop raised by Mr. Taylor in Khorda, in the district of Pooree, was destroyed by cattle. The experiment will be repeated with some seeds Mr. Taylor has managed to procure. From the reports received by him, the Commissioner finds the climate of Orissa to be favourable to the growth of this cotton. He expects a good outturn from proper cultivatio[illegible] cotton, however, is liable to hybridis[illegible] t[illegible]ruction of the uniformity of colour. The Collector of [illegible]ore (Mr. [illegible]adon) reports: "I received the seed in July 1883. and [illegible]ediately sowed it in boxes. but owing to heavy rain and flood did not transplant till late in September, as I was afraid the damp soil would be too much for the young plants. A great many of the seeds did not germinate, which I attribute to the bad quality of the seed itself. Out of 69 plants which I reared, 13 died on transplantation. The survivors grew very rapidly, and began to throw out buds almost immediately. The cotton ripened and was plucked in January, February, and March, and gave an out-turn of seven pounds without seed, or an average of two ounces per plant. I watered the little bushes for a short time after transplanting, as owing to the early cessation of the rains there was little moisture in the ground. I presume it would not be necessary in an ordinary year. Almost immediately after plucking in April, the bushes began to flower again, and fresh pods formed, but as soon as the rains commenced they rotted and fell off the bushes. Since the rains the bushes have made tremendous growth, and are now 4 to 5 feet high, and though originally planted 3′ × 3′, are touching each other and overcrowded, and the little plantation has a dense appearance. There are now plenty of buds on the bushes, and some are already in flower. They should yield well in the cold weather. The soil is the ordinary dark-coloured sandy loam which prevails to a great extent in this part of the district. I can get no reliable data from the natives close here regarding the out-turn of the ordinary country cotton; but those who have seen the plants grown by me seem to be of opinion that they would give the larger out-turn."

In the Chota Nagpore Division, the Superintendent of the Hazaribagh Jail sowed two acres of prepared land with half a pound of the seed, in the beginning of October 1883, in drills six feet apart. Only about 100 of the seeds germinated and formed plants. He caused them to be weeded and watered twice a week. The plants are still very small; only about eigh inches high, although some of them are now in flower. The Superintendent intends to make another trial this year, and has therefore asked for some more seed. The District Engineer has collected a quantity of seed from the last crop, and this will be made over to the Superintendent.

The Superintending Engineer, Hazaribagh, received half-a-pound of the seed on the 29th July 1883, and sowed them in shallow boxes placed in the shade. Most of the seed germinated within a week. As soon as the plants, about 250 in number, grew up to be sufficiently strong to withstand heavy rain, they were transplanted and put six feet apart on prepared ground, in the road cess office compound, by the third week of August 1883. Earth was then heaped up round the roots of the young plants. They were watered twice a week during the cold season, and four times a week during the hot weather. The first crop yielded 14 pounds of cotton. The shrubs are now again in flower, and will shortly yield a second crop. They are gradually becoming bushy, though the tallest plant is not more than three feet high.

A sample of the cotton grown in the garden of Mr. Frizoni of Hazaribagh, has been received. The sample appears satisfactory to Mr. Hewitt.

The Deputy Commissioner of Lohardugga reports that the Assistant Commissioner of Palamow distributed seeds to three of the zemindars of his sub-division. In two cases the experiments failed, the plants dying after attaining a height of 9 inches. In the third case, the seeds were sown in the latter part of October 1883, and the plants have since grown up to a height of two feet, and have commenced to flower and bear pods. The Assistant Commissioner thinks that the seeds have not had a fair trial, and asks for a further supply.

In the head-quarters sub-division the experiments made by the ryots and Mr. Peppe were unsuccessful. The Deputy Collector, Baboo Mohendronath Mookerjee, made three experiments, two of which failed. The last made in September proved to some extent successful. The seeds were sown on soil "loose and damp, neither dry nor clayey and stiff, and under the favour of alternate sunshine and cloud the seeds germinated quickly, and about 90 per cent came out successful, but the plants appeared [illegible]ly and many died out, and after several casualties, about 50 per cent survived to put forth leaves, 40 per cent flowered, and 2[illegible] per cent gave pods."

[illegible] Manbhoom the pound of seeds received was sown b[illegible] c[illegible] by Dr. H. W. Hill. Only a small portion of these germinated, and the cotton produced was small in quantity and of a brownish-red colour. Dr. Hill thinks that the khakie cotton is a hybrid between *Gassypinum herbaceum* and *Gassypinum herbadence.* He says that a species of this plant, if not indigenous, is cultivated to some extent in parts of Patkom and Burrabhoom, and chiefly by the Sonthals, who call it *khureeah kapas* in contradistinction to *kurawah kapas*, or white cotton. The colour of the latter is that of the khaki cotton experimented on, and the Sonthals spin and weave it into a sort of coarse cloth. The species found in the district is considered by Dr. Hill to be a hybrid of *Gassypinum herbaceum.*

Miscellaneous Items.

THE planters of Fiji are considering a scheme for importing Tamil labour for their estates.

THE exports of tea from all China amount to 123 million pounds, against 139 millions last year, to England alone.

THE net Indian sea and land customs revenue for the first eight months of the current financial year amounted to Rs. 53,42,000, as compared with Rs. 65,61,000 in the corresponding period of last year.

WE understand that all the shares, amounting to Rs. 4,00,000, of the Poona Deccan Paper Mills Company (Limited), are taken up. The Company will now be registered, and allotment of shares made within a short time.

THE Christmas rains are apparently absent in Lucknow, for, with the exception of a few drops lately, the fall holds off. A good shower would be of inestimable value to the crops just now. There is a general barometrical depression over a large area of country, and rain is generally looked for.

A SUPPLY of mangoes was exhibited for sale in the fruit bazaar, at the back of the Bangalore New Market, on the 21st ultimo, and they were readily bought up by the butlers. It was singular to see mangoes at this season of the year; but we were told that they were imported fruits. It is a pity, says a contemporary, they were not kept for the Show on the 24th idem.

THE news comes from Australia of the arrival at Melbourne of a shipment of Java teas. *It is said that the Java* planters have determined to create a market for their teas in Australia, and propose to set about devices to "popularise" that article. This intelligence will hardly be received with satisfaction by the Indian tea-planter who has been attempting for some years to popularise Indian tea in Australia.

THE latest use to which it has been found possible to put paper is for making the floors of skating rinks. Straw boards are first pressed together under a hydraulic press, and when seasoned and dried, sawn into flooring boards, and fixed edge upwards. The surface is then sand-papered until it becomes as smooth and slippery as a sheet of ice, but yet it is said to be so adhesive that the roller does not slip upon it.

THE Government of Bengal has authorised the payment, by the rangers and foresters in charge of sixteen revenue stations in the Sunderbuns Forests Division, of an extra reward of Rs. 2[illegible] for each full grown tiger, and Rs. 10 for each tiger cub that can be proved to have been shot, or destroyed in any other way, in the Sunderbuns reserved or protected forests, in addition to the authorised rewards payable by the district officers.

A GENTLEMAN, named Auffray, has just made a discovery which is likely to confer a great benefit on the dwellers in Mauritius. He has discovered a method of producing sulphate of quinine from the bark of cinchona, which grows abundantly in the islands, and his process is said to be both cheap and simple. Considering that for some years past the colony has expended Rs. 1,10,000 in the purchase of quinine from abroad, the value of the discovery is likely to be thoroughly appreciated.

WE regret to learn that at Sholapore, Kaladgi, and the country immediately adjacent, there is [illegible] failure of crops to the extent officially known as "a scarcity." This is attributable to the want of dew. The Government have already taken steps for the remission of revenue, and it will probably not be necessary to open relief works, as owing to railway facilities there is a good supply of grain. The condition of these districts has, nevertheless, occupied the close attention of Government.

A FEW days ago a Malay at Paugeran, while walking along, a narrow path through a swamp, came in contact with a python, which, after biting his leg, coiled itself round it; he had however presence of mind enough to seize the reptile by the head, and by forcing its jaws open until they were dislocated [illegible] disabled him. On arriving at the village the alarm was given, and the people turning out, found the snake, which had crept into the scrub, and despatched it. It was 18 feet in length, so the man must have had [illegible]pe.

THE Government of India are bent upon the rapid development of the Umaria coal fields in the Rewah State, which are expected to yield a large supply of excellent coal. The railway from Kutni on the Allahabad-Jubbulpore line to Umaria will be completed as quickly as possible, and the coal thus be brought within easy reach of consumers. Mr. Hughes, of the Geological Survey, an expert in the matter of Indian coal, will, as we have already stated, direct operations at the coal fields during the next twelve months, and will direct the minin operations in a scientific way.

THE following account of a rather remarkable hen is given by a correspondent of *Land and Water* :—"She is a cross between a Game hen and a Brahma cock, and was hatched in May, 1882. She commenced laying in January of the following year, and laid 189 eggs within the twelve months. This year she has laid 156 eggs, and is still laying. I may add that she is quite a Cockney, having lived on the leads of a public office for the last two years, her owner being the hall porter. She is very fond of lying before the fire, stretching herself like a dog At meal times a chair is placed for her at the table, her food being washed down with a liberal supply of stout. Possibly it is the latter, combined with the warmth of her quarters, that has caused her to lay so well. The most curious thing is that a great number of the eggs have been laid in the lap of the porter's wife."

THE officers in charge of the Commissariat Department, Jellapahar, recently opened a silo. Six were constructed about five months ago by excavating earth to the depth of six feet. They were about 12 feet long by 12 feet in width. After they had been filled with grass in a very damp condition, the grass was well trodden down, a layer of mats and planks was placed on the top, and pressure given by six feet of earth heaped up with a slight slope on all sides. After the earth and planks, &c., had been removed, the grass in the silo opened was found to be of a greenish yellow colour, and the smell emitted was so disagreeable even for a depth of three feet that, as far as this silo is concerned, the trial is a failure. Even when sprinkled with salt after an exposure of nearly eighteen hours, hungry cattle ate barely half the quantity offered them, and this with little or no relish.

Selections.

FIBRE-FXTRACTING MACHINES.

THE following report of Messrs. J. W. Hanlon and L. Liotard, on the competition of machines in the extraction of Fibres, held in September last, will be read with interest. We defer any remarks of our own until the Government Resolution thereupon is published in the local Gazette :—

To the SECRETARY of the GOVERNMENT of BENGAL, Revenue Department, Calcutta the 24th November, 1884.

SIR,—We have the honour to report on the competition of machines in the extraction of fibres. Nine machines were entered for competition. These will be described briefly in the order in which they were placed in the shed erected for the purpose of the trials.

Account of the Machines.

I. A machine patented by Monsieur Berthet and constructed by Messrs. Talpin Frere et Cie of Rouen. This machine was brought to Calcutta by Sir Walter de Souza and entrusted to Dr. King, Superintendent of the Royal Botanical Gardens, Howrah. It is a large machine, rather straggling in appearance, and of ingenious, though not very efficient, mechanism. The principal parts are a couple of large drums carrying gun-metal scrapers. To keep the plants up to the scrapers each drum is fitted with an adjustable curved wooden block. The plants in the first place are fed to a set of rollers which operate upon the whole length at once, that is, the stem is placed parallel with the rollers. As the rollers are only about 4 feet long, most of the plants had to be cut to suitable lengths. After passing through the crushing rollers an endless wire rope carried the crushed stems to the beaters. First, one half is scraped at one drum, the cleaned end is then picked up by the endless rope, and the other half is carried past the other drum; finally, what is left is removed automatically from the rope before the latter passes again to the crushing rollers. This feeding arrangement did not work with any certainty. The cost of the machine is unknown.

II. A machine invented and patented by Mr. R. R. G. Hatti Boroöah a native gentleman of Upper Assam. This is a simple mechanical arrangement, consisting of two pairs of smooth wooden rollers on iron spindles, set in a line in a vertical frame. A spur wheel is geared to both sets of rollers, and motion is communicated through a set of bevil wheels by a horizontal shaft carrying the usual fast and loose pulleys. The machine is faulty in design, and is said to cost Rs. 300. Stems are passed through the rollers several times, and washed nearly as often, until clean fibre is obtained

III. An apparatus by Mr. Hatti Boroöah, worked by manual labour. This consists of two smooth rollers about 2 feet in length and 6 inches in diameter placed upright and worked by iron spur wheels put in motion by a central shaft, to which motion is communicated by a wooden lever 10 feet long turned by two men. In construction this apparatus is identical with the ordinary native sugar mill, an[illegible] is said to cost Rs. 50.

IV Pownal[illegible] Patent Flax scrap[illegible], constructed in Wellington, New Zealand, an[illegible] sent out to the [illegible]re of Messrs. Heilgers & Co. of Calcutta. Th[illegible]s a very com[illegible]ct little machine, driven by steam-power. It co[illegible]sists of a pair [illegible] horizontal grooved iro[illegible]ollers placed at the centre [illegible]op of the machine. Immedi[illegible]below [illegible] rollers are two drums provided alternately with [illegible] faced iron ribs. Below these drums are two smooth rollers of the same size as the upper grooved ones. The fibrous stems, when put to the grooved rollers, are drawn in and crushed, and then forced between the drums, where, by the action of the scrapers of one drum against the alternate flat bar or rib of the other, the woody part and refuse matter are scraped off. The fibre dropping between the lower smooth rollers is held firm and is brought out underneath the machine. The cost of the machine is unknown.

V. A smaller machine of an exactly similar description by the same owner. This is workable by hand or steam-power. Price unknown.

VI. Another small compact iron machine on the same principle as Nos. 4 and 5, and by the same owner. There is, however, this difference in this machine, that the drums are made of thin plate iron, and so constructed as to ensure a certain elasticity when the scrapers come in contact with one another as the stems are passing through.

VII. A small machine belonging to the same owner as the three last mentioned. This is workable by either manual labour or steam-power. Two small grooved iron rollers crush the stem and push them forward between a wheel four feet in diamater provided with scrapers, and a zinc frame in close adjustment with the scrapers. The stems having been crushed by the rollers, the action of the scraping wheel against the zinc frame removes refuse matter from the stems, and brings the latter between two smooth rollers at the bottom, whence the fibre is taken out.

VIII. Cantwell's patent process for extracting fibre-bearing plants. The patentee describes his process thus : using for this purpose a roll mill patented by him for the expression of sugar-cane juice : "My patent sugar-cane mill is modified for this purpose (extraction of fibre) by the insertion of a spring or other elastic substance at the back of the crusher or bearings, so as to prevent the fibre in the plant from being crushed or ground in the process of crushing. This can be done in a few minutes by removing the rigid abutment piece used when crushing sugar-cane and substituting for it the spring. The crushing process is primarily intended for endogenous plants that cannot be retted, but exogenous plants are simply crushed one or more times and then retted in water for a short period, varying from two to four days according to the amount of crushing the plant may have received. The exogenous plants having hard woody centres are first crushed, then the fibre part pealed off and again passed through the mill, and then retted for from 24 to 48 hours"

IX. The universal fibre-cleaning machine, invented by Mr. H. C. Smith, manufactured and improved by Messrs. Death and Ellwood of Leicester, and brought to public notice by the General Fibre Company of London, is a very simple, compact, and well-designed machine. It consists of a cast-iron drum, perfectly balanced, on which eight-gun-metal beaters are bolted. The drum resolves in front of a table or feed-plate fixed below the centre of the drum so as to give a scraping action when the beaters pass it. The feed-plate is adjustable to and from the beaters by set screws, so that a fine or thick fibre can be cleaned. Immediately below the feed-table is a jet pipe which throws a strong thin flat sheet of water against the whole width of the drum. These are the essential parts of the machine, and they are mounted on a cast-iron frame, which carries them as well as a trough to receive and let out water, refuse and waste, and to prevent the water being thrown about. Two men feed the machine ; each taking from three to five leaves or stems at a time, places the thick ends upon the feed-table and pushes them against the revolving drum provided with beaters. These smash the woody parts of stems, disengage the pulpy matters of leaves, loosen all refuse matter, and by their action draw the crushed stems or leaves under the drum, here the sheet of water presses the stems or leaves against the beaters, a beating and scraping action continues, and the sheet of water acting as a cleanser as well as an elastic cushion or backing to the fibre while it is struck by the beaters, ensures a thorough cleaning. The stems or leaves are allowed to pass half way into the machine, and when withdrawn, all extractive matter has gone and clean fibre is obtained. This is held in the hand of the operators, who then pass and withdraw the thin ends in the same way. The result is clean pure fibre, which is then hung up to dry, and when dry is ready to be baled at once. The cost of a single machine is £55, that of a double one, complete, is £100. A semi-portable engine to work two of the machines is supplied by the General Fibre Company of London for £82-10. On comparatively small plantations, instead of the steam engine, bullock gear can be used which, for a single machine, is supplied at £30 by the Company.

Programme for the tests.

2. We laid down the following programme for testing the above machines :—

15th October 1884, Jute (Corchorus olitorius).
15th ,, Sunn (Crotalaria juncea).
16th ,, Potari (Abutilon indicum).
16th ,, Bhendi (Hibiscus esculentus).
16th ,, Joba (Hibiscus rosa-sinensis).
16th ,, Stolpaddo (Hibiscus mutabilis).
17th ,, Plantain (Musa paradisiaca).
17th ,, Madar (Calotropis gigantea).
17th ,, Nona (Anona reticulata)
17th ,, Bon-dheuras (Hibiscus ficulneus.
18th ,, Agave (Agave americana).
18th ,, Dhoncha (Sesbania aculeata).
20th ,, Rhea (Bœhmeria nivea).
20th ,, Sansaviera (sansevera Zeylanica).
20th ,, Meshta (Hibiscus sabdariffa)

Quantities of each of these fibrous plants were brought in on the respective days and were weighed and given for each of [illegible] [illegible]ines to be tested. A note was kept of the quantity of stem[illegible] leaves given, of the time at which each machine began work, [illegible] time at which each finished work, and the weight of the d[illegible] fibre [illegible]tained, as also the number of hands working each machi[illegible]

Results of the tests.

3. The following table represents the results of the tests. It will be seen that in the case of some of the machines there has been no result except that of failure :—

Name of Fibre.	Quantity of green stems supplied.	Hours at which work began.	Time of expiry of work.	Weight dry Fibre extracted.		Percentage of dry Fibre to weight of green stems.	Remarks.
	Srs.	P.M.	P.M.	Srs.	Chs.		
Dhoncha	10	12-35	..	..		..	The fibres were torn away and destroyed.
Rhea	20	4-6	..	..		..	Failed. The stems glued on the rollers.
No. II.—Mr. Borooah's Machine, *motive power, and 2 men.*							
Rhea	5	4-30	4-55	0	3	3-75	This machine was entered to extract only Rhea. The fibre obtained is too much crushed and towey.
No. III.—Mr. Borooahs Hand-Machine, 3 *men.*							
Madar	5	12-25	1-21	0	1½	1·56	Fibre reded. to tow, with pieces of bark adhering.
Rhea	1	3-5	4-10	0	0½	3·12	Clean, but too much crushed and towey.
No. IV.—Pownall's Flax Scraper (1), *motive power, and 2 men.*							
Jute	15	1-5	1-28	20	1	3·38	Full of bark and woody matter. Fibre dirty.
Sunn	5	3-53	4	0	11	13·7	Ditto ditto.
Bhendi	5	..	..	..		..	Would not pass thro' the machine : the stems stuck to the rollers.
Potari	6	..	..	..		..	
Joba	2	..	..	..		..	Fibres torn away. No results.
Stolpoddo	3	..	..	..		..	
Plantain	5	1-47	1-51	..		..	Tore away the fibres.
Agave	10	12-45	1	0	2½	1·4[illegible]	Very insufficiently cleaned ; dirty fibre
Dhoncha	2	1	1-12	0	2	6·25	Better than, preceding but still dirty.
Rhea	5	3-52	..	..		..	Stems got clogged among the rollers, fibres torn away.
No. V.—Pownall's Flax Scraper (2), *hand power : 3 men in all.*							
Jute	10	1-50	2-15	0	3½	..	Failed entirely to clean the fibre. Percentage not worked because of the quantity of wood in the fibre
No. VI.—Pownall's Flax Scraper (3), *hand power : 3 men in all.*							
Jute	10	2-42	2-50	1	2	..	Do. do
No. VII.—Pownall's Flax Scraper (4), *hand power 3 men in all.*							
Jute	10	1-30	1-48	0	3¾	..	Do. Do.
Death and Ellwood's Machine, *motive power and 3 men.*							Results very satisfactory. Even Bondheuras with its large amount of mucilage was worked out with the greatest ease. Rhea was cleaned well ; better than any produced in any trial hitherto held in India. The other plants also yielded fibres far superior to any samples to be had here.
Rhea	40	3-17	3-48		15½* 8½†	2·42 1·33	
Sanseviera	2	4-8	4-33		4½	1·41	
Agave	15	4-45	4-50		4½* 1 †	1·28 ·42	
		A.M.	A.M.				
Bon-dheras (wild bhendi)	20	11-35	11-51		9 * 4½†	2·81 1·41	Fibre harsh.
Plantain	..	..	..		¼	..	
Pine-apple	..	..	..		1	..	
No. I.—Berthet's Machine, *motive power, and 2 men.*							
Ju[illegible]	33	12-36	1	2	2	6·43	Very insufficiently cleaned ; much waste.
Sunn	10	3-28	3-36	0	10	6·25	Ditto.
Bh[illegible]ndi	20	..	..	..		..	Failed to extract the fibre. The stems in the case of Bhendi were gummed to the rollers and in the case of the others were torn and destroyed by the beaters.
Po[illegible]ri	6	..	..	..		..	
Job[illegible]	4	..	..	..		..	
Stol[illegible]ddo	8	..	..	..		..	
[illegible]ain	15	1-7	1-12	0	2½	1·04	Much waste not sufficiently cleaned.
A[illegible]	20	12-20	12-36	0	6½	2·10	Ditto.

* Straight running fibres.
† Waste-fibre.

Remarks on the results.

2. *Monsieur Berthet's machine* would probably have shown somewhat better results than it actually did, if a competent person had been deputed to work it. Taking the results as produced, the machine has been found to be both destructive and defective—destructive in that it has caused an unnecessarily large amount of wastage of fibre, and defective in that it has failed to produce the fibre in a sufficiently clean state : woody parts, pulp, and pieces of the bark adhere to the fibres produced, and these extraneous matters, besides depreciating the intrinsic value of the fibres, add to the weight shown in the fifth and sixth columns of the statement.

The fibres obtained from *Mr. Borooah's machines* were sufficiently clean, but the repeated and excessive crushing to which they were subjected has caused a depreciation in their value, besides giving them a towey appearance. To these defects must be added the very slow rate of out-turn which, in the case of the steam power machine, was 3 chattaks of Rhea fibre in 25 minutes, and in the case of the hand-machine, half a chattak of Rhea in 20 minutes, and 1½ chattaks of madar in 56 minutes.

Of Pownall's four machines, not one produced any satisfactory results, notwithstanding the care and attention with which they were adjusted and worked by the agents under whose charge they were. The fibres obtained are conspicuous by their dirty condition, being full of bark and woody matters, and they become brown when drying.

Mr. Cantwell's process produced fibres which are certainly free from wood, bark, or pulp, but the retting has injured the fibres, in that it has rendered them brown. The improvement claimed by the patentee over the common native system is, that the natives by not crushing the stems have to allow them to steep for a period of 8 to 12 days, while he by crushing them in his sugarcane mill facilitates the action of the water while retting, and thus reduces the period of retting to 2 or 3 days. Whatever advantage this may have, it does not, judging from the results, improve the quality of the fibre, or reduce the cost of extraction, while it adds to it the labour and expense of crushing.

Messrs. Death and Ellwood's machine did not work on the days specified above, as Mr. Death, who was coming out to work it himself, was unavoidably detained on the way by quarantine regulations. As the dates specified were not a condition of the tests or of the award of prize, we arranged to have a test of this machine during the following week. The plants mentioned in the above table were supplied on the 28th October, and the fibres were worked out by this machine without a hitch of any kind. Indeed, the working parts are of so simple a character, of such sound material, and correct adjustment, that they leave nothing to be desired. The jet of water plays a most important part in the extraction of fibres ; for the stems, after having been bruised by the beaters against the edge of the feed-table receive a very thorough treatment by the beaters on the broad jet of water, and when pulled out they are found to have been freed of all extraneous matters, leaving clean white fibre as the result. The machine is, moreover, as has been proved by the test, capable of treating all fibre-bearing plants, whether exogenous or endogenous with the same facility. A semi-portable engine of 2½ nominal horse-power supplied the motion to the double machine used at the trials. At a rough estimate 1·75 indicated H. P. was expended in driving the double machine at 400 revolutions per minute while at work. As only one half of the machine was used for the purposes of the trials, the other half ran idle. The quantity of water required appears to be about 400 gallons per hour for one machine, but the water can be used twice or thrice over.

Taking the data obtained at the trials as a guide, the out-turn of Rhea fibre from one (Death and Ellwood's machine) would be about 60 lbs. for a day of 10 hours. This assumes a percentage of 3·75 of fibre from 1,600 lbs. of green stalks. The operators were imported and to some extent trained hands, having worked similar machines in Madras, where they were accustomed to manipulate *Sanseviera Zealanica*, Still they did not seem quite at home with the Rhea stalks, and some allowance might resonably be made on this account. At the outside an increase of one-third would in our opinion represent an average day's work with dexterous and diligent workmen and stalks in good condition. It was noted that the stalks supplied to the machine were not uniform : they were of lengths varying from 2½ to 5 feet ; and in withdrawing the fibre of the longer stalks from the machine more waste was beaten out of them than from the smaller stems ranging up to 4 feet. The reason is simple enough ; the longer stems were rather too old for the yield of fibre, and had branched owing to the crop from which the stems were cut having been grown rather openly. The addition therefore of one-third would be equal to the work per diem of 2,200 lbs. of green stalks, per machine. This quantity might be expected to give at 3 per cent, an out turn of 66 lbs. of good, clean fibre. The value of this outturn, at £ 50 per ton, would be about 30 shillings.

It should be mentioned that owing to the late date of the trials with this machine, it was not found possible to procure suitable jute stems, as the local crops had already been cut. Some stems, however, which were over from the trials of the other machines and had been lying for about ten days on the ground were tried. The machine cleaned them with ease ; but as the stems had been lying exposed to the sun, the fibre obtained was somewhat stained. It is necessary, for the efficient treatment of exogenous plants especially, that the stems should be operated upon as soon as possible after they are cut. The cutting also should take place before the plant reaches full maturity, and the proprietors of Death and Ellwood's machine rightly claim that the juices which contain the various gums and colouring matters in solution are then more readily removed by means of the water used. The [illegible]ls certainly bear this out, for the wild bhindi or bondheras, which are fully matured and to some extent hardened plants, [illegible] the day previous, gave the harshest fibre.

It remains to be settled whether the machine can be worked with profit. To solve this question completely and conclusively, detailed enquiries in various directions and much time would be needed, and we would have to wait for a valuation of the fibres by experts in Europe. It does not seem necessary to us to delay with this object either this report, or the recommendation we have to make, for the following reasons :—

(1) Although detailed statistical proofs are wanting, we have by rough calculation reason to believe that the machine can be worked with profit in this country, especially on jute, rhea, bou-dheras or wild bhendi, agave, sanseviera, and pine-apple.

(2) The machine is already at work in Mexico, in Jamaica, and several other countries, including Southern India, and yields a profit.

(3) At gardens, in factories where steam is already available, a few machines could be introduced at the minimum of outlay, as the cost of the machine alone would be incurred.

(4) Where water power is available, a turbine can be used, instead of the steam engine. When one machine is worked singly, the patent safety bullock gear supplied by the General Fibre Company can be used.

(5) When natives have gained experience in the feeding and working of the machine, they will probably be able to produce a larger quantity of fibre than at first.

The three last reasons form important considerations in reckoning the prospects which may be anticipated in this country. And as several firms in Calcutta have already made enquiries with a view to making use of the machine, and they seem satisfied with what they have learnt, it does not seem necessary for us to delay our report. We are satisfied that as an *extractor* of fibres Messrs. Death and Ellwood's machine is a distinct advance in mechanism of this class, that it extracts fibres in their natural colour and in good merchantable condition, that it operates on all plants with the same facility, and that it is suited to the requirements of this country, and is likely to prove of great service to its fibre industry. On these grounds we recommend that the full amount available for the Government prize may be awarded to the General Fibre Company of London.

We have the honor to be, Sir, your most obedent servants,

J. W, HANLON.
L. LIOTARD.

THE FUTURE OF WHEAT PRODUCTION.

BY LIEUTENANT-COLONEL WHEATLEY.

I HAVE just returned from a tour of about 6,000 miles in Canada and the United States, our great competitors in the production of wheat; and as singularly little seems to be known here, even now, as to many important conditions of that production, I will, with your permission, state a few facts for the information of English farmers. I visited portions of Manitoba and the Canadian North West, as also of the adjoining States of Dakota and Minnesota, in the Union, the great Red River country, as well as a great extent of country south and east. My visit was necessarily a hurried one, but I saw many things that surprised and instructed me, and I wish our farmers could see them also. One of the things that astonished me first and most, was the absolutely universal use through every district, of the self-binding reaper. I think I do not exaggerate when I say that throughout that great continent such a man as a farmer who ties his wheat, barley, or oats by hand is unknown ; at any rate, I never saw or could hear of one. In England I believe that nine out of ten of our farmers have never even seen a self-binder at work. Since my return I have asked several why they do not use them here, and I have been told—1. In these bad times a farmer cannot afford to spend £60 on a machine. 2. In America the country where wheat is grown is quite flat, and the farming is done on a very large scale, and is more suitable for self binders. In reply I would say, first, that the regular price now paid in the States for a self-binder is 160 dols., say £33 (although not equal, doubtless, to those of English make, and though the price in Canada is higher, owing to their system of protection, coupled with their comparative backwardness in manufactures). Moreover, seeing that reaping machines are pretty generally used here, the calculation should be, not of the total cost of a self-binder, but the difference between the cost of an ordinary reaper and a self-binder, a comparatively small sum. Secondly, in America a great deal of wheat-growing land is undoubtedly quite flat—for example, the magnificent Red River country ; but a still larger area, termed Rolling Prairie, is extremely like an average English county, without any trees or hedges, and the self-binder is used there just as easily as anywhere else. Moreover, it is quite a mistake to suppose that in America the farms generally are on a large scale. The Canadian quarter section of 160 acres fairly represents the amount of land ordinarily taken up, and broken by degrees.

There are a few gigantic wheat farms both in Canada and the States, but they are almost as exceptional as the 300-acre field we hear about in Leicestershire. I asked a farmer in Manitoba whom I saw threshing out his wheat, how long he had used self-binders. He said, "For about nine years!" I said I did not know they had been invented so long. He said, "Not the twine ones, but we used wire, and though it occasionally damaged the thresher it did not do much harm, and we could never have done without them." When the wheat, barley, or oats are ready for cutting, the regular thing is for the farmer to turn in with a team of horses and a self-binder, and do the whole work by himself with the exception of being followed by a man or boy, often his own son, to stand the sheaves up as they are thrown off, his labour bill being consequently almost *nil*. I would ask our farmers to compare their own outlay on this work with that of the man in America who is growing wheat against them. I think if they would follow the system they would save at least four shillings an acre, besides the risk of the grain spoiling on the ground in wet weather, if not tied immediately after cutting. In America the threshing machine travels round the country, just as in England. The fuel used is nothing but straw, and this is the only use the straw is to the farmer in that country. At nightfall, when the threshing is finished, the great heaps of straw, like rows of houses in size, are set alight, and the prairie is a wonderful sight as the train rushes along with fires lighting up the horizon all around. Here our farmers have an enormous advantage. Even in these times the value of the straw ought to more than pay rent, rates, and taxes, whereas in America (I speak of the great wheat-growing country in the West), beyond what is wanted to feed the threshing machine, the straw is merely an encumbrance.

When I was in the Red River country in September the farmers were receiving 55 cents a bushel, say 18s. a quarter, for their wheat delivered at the elevators, to which it had probably to be hauled on an average at least ten miles. Since then the price has fallen considerably, and they are doubtless not getting so much. I was informed on the most competent authority there, that the farmers, as a rule, are hopelessly impoverished and in debt, exceeding anything known in England. Moreover, they are wearing out even the grand soil of the country, and must either adopt mixed farming, cattle being almost unknown there at present, or move further back from the railways and take up fresh land, when, unless we are foolish enough in England, to find money for them to build new railways, which will never pay a cent to any but the people of the country, they will not long be able to send wheat here at present prices. My conclusion is that wheat will continue to be grown in England, and at a profit, too, if our farmers will only adopt the economies practised by their brethren over the water. They have the grand advantage of a market at their doors for eggs, poultry, vegetables, &c., not enjoyed by their competitors, and if we assume, as I think we may fairly do, that the straw will pay rent, rates, and taxes, they are getting 14s. a quarter at this moment more for their wheat—say £2 10*s*. an acre, calculating 30 bushels grown to the acre—to pay for manure, while such labour as is essential is to be obtained at certainly less than half the cost. It is to be recollected, too, that all that country is under snow and ice for about six months in the year—a terrible handicap for them in every way. I could write much more, but must not trespass on your space beyond saying I returned home doubly convinced of the gross folly of protection. With their wonderful soil, resources, and ingenuity, the farmers and manufacturers of America find it at least as hard to secure a margin of profit as in this country, and the complaints of depression in agriculture and trade are, if possible, louder and deeper than at home.

On this subject Messrs. James and Fredrick Howard of the Britannia Ironworks, Bedford, have addressed the following to the editor of the *Pall Mall Gazette* :—

"We have read with interest the communication in your columns from Lieutenant-Colonel Wheatley. With respect to his remarks upon the use of harvesting machinery in the United States, he is mistaken as to the universal adoption of the self-binder. There are an immense number of self-delivery reapers in use (machines which deliver the corn in sheaves unbound), and which are sold at about 160 dollars each, but your correspondent is utterly mistaken in his statement that self-binders are to be purchased in the States for that sum. The average price of a self-binder—that is, a machine which cuts and delivers sheaves bound with string—is 300 dollars. The two largest manufacturers of binders in the United States have depots in London ; their prices are £60 or sixty guineas each, and they get rather higher prices in America for the same machines than they do in England. Lieutenant-Colonel Wheatley is very much mistaken in the following assertion—'In England, I believe, nine out of every ten of our farmers have never even seen a self-binder at work.' We should say that nine out of ten have seen them at work, for self-binders have been introduced into almost every locality, and the reasons against their more general adoption are not those assigned by your correspondent ; the fact is that until recently no self-binder has been produced capable of dealing with the heavier and more laid crops which have to be encountered in England. The English manufacturers have for years past been striving to overcome the difficulties in dealing with such crops ; and that they have succeeded was proved at the trials which took place last harvest by the Royal Agricultural Society of England, when both the £100 and £50 prizes were carried off by two English machines. With respect to the future we agree with your correspondent that 'wheat will continue to be grown in England,' and from our knowledge of America, and our constant intercourse with agriculturists in that and other wheat-producing countries, we feel convinced that the present unremunerative prices will check production, and the inveitable result will be higher prices. Wheat in the Western States of America is already termed 'the poor man's crop,' by which is meant that those who depend upon it are kept poor. Those who can afford to raise cattle, leave wheat-growing to the poorer farmers."—*Pall Mall Gazette.*

PRINCIPAL WALLEY ON THE DISEASES OF STOCK.

In reference to the food supply of our domestic animals, do we not find that in many instances breeders of stock are utterly ignorant as to the physiological wants of the creatures upon which they are so largely dependent for their own well-being? I grant that very often the feeder is not to blame; he provides food such as he has been led to expect is suited to the purpose to which he applies it, but he does not consider the digestive or assimilative capabilities of the animals placed under his care, and in this way he often meets with serious and unexpected losses. And more than this the tendency has grown of late years of purchasing very large quantities of what we may call prepared foods, *i.e.*, cakes and meals and other kinds of manufactured feeding stuffs. These are in themselves splendid materials for feeding purposes; but how often are they made the channels by which inferior stuffs are got rid of at superior prices, to the detriment more frequently of the buyer than the seller.

Every day is the attention of those who are engaged in the investigation of the etiology of disease more particularly directed to the truth of what I have stated. Cattle are found dying after having partaken of a feed of a particular kind of cheap meal or of cheap cake, and on examination these are found to be mixed with different kinds of deleterious matter, in a state of chemical change, or swarming with countless millions of bacteria. Surely it were better that farmers should devote their attention more largely to this subject than they have done, and not take everything they are told by interested parties as gospel. I do not wish, nor do I intend by these remarks to injure sellers of such material, for I am perfectly well aware that in very many cases they are totally ignorant of the fact that the wares they vend have anything of a deleterious nature about them, and that, figuratively speaking, 'there is death in the *mess of pottage* they have prepared.' But when such things are frequently brought to light, it behoves both sellers and buyers to be on their guard.

The last division of sanitation I wish to touch upon to-day is our 'food supply.' Gentlemen, I should have been pleased had I been in a position to say to you on this occasion that the representations which have been made, and the labour which has been spent, in our endeavours to put this matter on a more satisfactory footing than it has hitherto occupied, but I have still to say that it stands pretty much where it was when I last addressed you on this subject. Certainly one step in advance has been gained, inasmuch as probably one of the largest veterinary gatherings which ever met in this country (the meeting of the British National Veterinary Medical Association, held in Manchester in August) adopted certain resolutions, which I had the pleasure and privilege to propose, tending to place this subject in its proper position, and to authoritatively show to those who have legislation on such subject in their hands, the steps that ought to be taken for the protection of our poorer brethren from the evil effects of unwholesome and injurious food. As matters are now, vile traffickers in a vile traffic are privileged to carry on their disgusting, and often death-dealing trade with impunity, and to gloat over their ill-gotten gains to their hearts' content.

Of equal importance with the foregoing is the subject of 'humanity to animals,' and I will preface the remarks I have to make under this head by observing that the veterinary surgeon is nothing if he is not 'humanitarian.' His daily life, his hourly warfare is with suffering, and he would be a brute indeed if he did not yield to the softening influence exerted by the continual contemplation of pain, which he is ofttimes powerless to relieve, and if such suffering did not give him a more extended sympathy with the helpless brute creation.

There are certain kinds of interference with the conscience and freedom of action of professional men which must be strenuously opposed, and feeling, as I do, that much *unnecessary suffering* is caused to animals by the performance of *needless* operations, I must nevertheless confess that it is painful and annoying to see men stand up in a public meeting as the defenders of the animal world, and impute sordid and mercenary motives to those whose whole life is, as a rule, one of self-abnegation. I refer here to the charges made against our profession in connection with the subject of docking, at the meeting in Manchester to which I have before referred. I could not help regretting at the time—I regret it equally now—that a feeling of antagonism should have been stirred up between a most useful and most benevolent society and our profession, by the ill-timed and ill judged observations of those who were supposed to represent the views of the former; and I sincerely hope that it will never again be my lot to witness the repetition of such a painful scene.

It is not my intention to refer further to the matter of 'docking horses.' I have already expressed myself publicly on this subject; but I must take this opportunity of considering, though it may be briefly, another and equally important subject, *viz.*, the 'overstocking of the udders of cows.'

This is a matter upon which one would think, there ought to be difference of opinion amongst professional men; and while I [illegible] prepared to allow that every man has a right to his own opinion in all things, I must at the same time declare that I cannot understand how an educated veterinary surgeon, with a knowledge of physiology, and a knowledge of the laws which control and guide the faculty of sensation, can be found to defend such an unwarrantable practice, and even to refer to nature herself for a warrant for such practices. But so it is, and very specious are the arguments used, as they always may be used, in defence of the cruelty. The question is, in the first place, asked in our professional journals, by one of the defenders of over-stocking, What about nature? How do those animals get relief who are unfortunate enough to lose their offspring immediately they are born into the world? I admit that the question is a specious one, but I do not admit that nature's cruelties to animals in a state of nature are, in any sense of the word, a warrant for our cruelties to animals in a state of domestication. It is argued that nature relieves herself by the pressure of the milk upon distended teats leading to relaxation of their sphincters, and thus providing an outflow for the retained milk, and relief for the overcharged gland; but is this always the case? What percentage of animals would there be that would not gain relief in this way? Let the records of the daily practice of those who are engaged in the treatment of animals in town dairies give the answer. Why do we meet with so many cases of mammitis in this city? and to what is it attributable? Largely, I answer, to the absurd, injurious, and cruel system of overstocking, which is so frequently practised by the sellers. But, it may be rightly asked, has the buyer nothing to do with this? The answer is an affirmative one, for if buyers of over stocked animals were not forthcoming it would not be worth the while of sellers to practise the system. A second argument is made use of, to the effect that there is no pain in over-stocking. Such an assertion to me savours of a melancholy ignorance of the structure and function of secreting glands in general. The udder is an organ of highly complex conformation provided extensively with sensory nerves, and of great vascularity. Its acini are so intimately connected with each other that it is almost impossible that relief should be gained in the usual way, *i.e.*, by swelling, when it becomes the subject of active hyperæmia or of inflammation; consequently, whenever the outflow of milk is prevented, pressure is exerted upon the acini and upon the blood-vessels; tension follows, and, after this, pressure upon the terminal ends of the sensory nerves, with the natural result of acute suffering. This latter is shown by the stiff, straddling, and sore gait of the victims of man's cupidity; by the ofttimes quickened pulse, the heightened temperature, and the unwillingness to move, observed in such cases. Some years ago I was called upon to examine a flock of blackfaced ewes, of whose number between 60 and 70 had been brutally mutilated by some unknown miscreant, by the removal, wholly or partially, of their teats; and as the wounds caused thereby became healed, the outflow of milk was effectually prevented, and at lambing time (the lambs not being able to draw off the milk) the poor animals were found wandering mopishly and miserably about the field, careless of their offspring, refusing to feed, and grinding their teeth in a most heartrending fashion. Was there no pain here? and, if not, whence the suffering? But it may be said Ah! here you had the outlet for the flow of milk hermetically sealed. Granted all this, and giving the benefit of the doubt, to as great an extent as is possible, to the distended udder with unsealed teats, I have no hesitation in asserting that, even when the milk flows naturally and freely away, even then, I say, pain is produced. Unfortunately, the poor cow cannot speak; but all females are not in that defenceless position, and can fortunately get indubitable evidence, by analogy of the great pain which is caused, even when the sphincters of the teats are relaxed, by allowing the mammary gland to become distended beyond its natural capacity, and we can even gain valuable confirmatory evidence on this point from the effects produced by the over-distension of distensile organs in our own bodies; and the heaviest punishment I would wish to see inflicted either upon over-stockers or upon those who defend the practice would be that they should be placed in the position of the over-stocked cow for a period of twenty-four or thirty-six hours.

Another remarkable piece of evidence in favour of over stocking, or rather in defence of the operation, is sought to be drawn from the natural process of drying of the udder when cows are turned off milking for the purpose of fattening. It is stated that the natural result of allowing the milk to accumulate in the udder is the suppression of its secretion by the pressure exerted on the gland cells. Doubtless this is so, but does it not occur to the mind of any one using such an argument that it has two edges, and the very fact of this suppression, following the accumulation of milk, is an argument of the strongest nature against the system of overstocking? and that in proportion as the glandular function is interfered with by over-stocking will be the loss to the purchaser of such animals? Gentlemen, I have one hope, and that is, that no pupil of mine will ever be found defending in a Court of justice an absolutely indefensible, and highly reprehensible practice; or, by defending it, indirectly encouraging the unscrupulous trader to resort to mechanical means (such as the insertion of rice into the teats or the application of elastic bands) of arresting the overflow of milk from the udders of the unfortunate victims of their cupidity.

In conclusion, I would urge upon you the necessity of using your best endeavours to make yourselves acquainted with all the bearings of medical and surgical pathology; of looking (*not glancing*) carefully into the nature of every diseased process which may come under observation, and of investigating for yourselves every case and every specimen of an interesting nature that may be brought to your notice, either here or elsewhere. Depend upon it, that your future success in life will be in exact proportion to the use you make in your student days, of the faculties with which nature or nature's God has endowed you, and that in proportion will these faculties fail if you allow the rust of indolence to accumulate about them, and the friction of indulgence to wear them prematurely away.—*North British Agriculturist.*

Advertisements.

A SKILFUL SURGICAL OPERATION.

THE American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billroth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms:—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "*all gone*" sensation; a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow; the hands and feet become cold and sticky—a cold perspiration. The sufferers feel tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often-times there is a palpitation of the heart, and the patient fears he may have heart, disease. Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomes closed, or nearly so. Although this disease is indeed alarming, sufferers with the above-named symptoms should not feel nervous, for nine hundred and ninety-nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner. The safest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White (Limited), 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

ST. MARY-STREET, PETERBOROUGH.
November 29th, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr. A. J. WHITE. WILLIAM BRENT.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer described it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Sd,) VINCENT A. WILLS,
Chemist-Dentist, Merthyr Tydvil.

To Mr. A. J. WHITE.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

Preston, Sept. 21st, 1883.

My dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully, in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.

I am, dear Sir, yours faithfully,
(Signed) W. BOWKER.

To A. J. WHITE, ESQ.

Spanish Town, Jamaica. West Indies, October 24, 1882.

Dear Sir,—I write to inform you that I have derived great benefit from "Seigel's Syrup." For some years I have suffered from liver complaint, with its many and varied concomitant evils, so that my life was a perpetual misery. Twelve months ago I was induced to try Seigel's Syrup, and although rather sceptical, having tried so many reputed infallible remedies, I determined to give it at least a fair trial. In two or three days I felt considerably better, and now at the end of twelve months (having continued taking it), I am glad to say that I am a different being altogether. It is said of certain pens that they "come as a boon and a blessing to men," and I have no reason to doubt the truthfulness of the statement. I can truly say, however, that Seigel's Syrup has come as a "boon and a blessing" to me. I have recommended it to several fellow-sufferers from this distressing complaint, and their testimony is quite in accordance with my own. Gratitude for the benefit I have derived from the excellent preparation, prompts me to furnish you with this unsolicited testimonial.

I am, dear Sir,
Yours ever gratefully,
(Signed) CAREY B. BERRY,
A. J. WHITE, Esq. Baptist Missionary.

Hensingham, Whitehaven, October 16, 1882.

Mr. A. J. WHITE.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(C) (Signed) JOHN H. LIGHTFOOT.

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PERSONS suffering from CATARRH, CONSUMPTION, COLDS, or OBSTINATE COUGHS, and generally those afflicted with diseases of the chest, bronchia, or lungs, should use GRIMAULT & CO.'S SYRUP OF HYPOPHOSPHITE OF LIME, which, prescribed for years past by the medical authorities of all countries, has invariably effected wonderful cures.

By the use of this Syrup the Cough is calmed, nocturnal sweats disappear, and the appetite rapidly improves—a fact soon demonstrated by an increase of weight and improved appearance.

GRIMAULT'S SYRUP is of a rose colour, and contained in flat oval bottles.

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This preparation enriches the blood, strengthens the bones, and improves all the vital energies.

Phosphate of Lime is the substance most necessary to life; indispensable for the formation and nutriment of the bony system, as for the transformation of food into muscular fibre. Without it, the body wastes away, and it is to supply the lack of Phosphate of Lime that Dusart's Syrup is so useful. It is of inestimable benefit for CONVALESCENTS, WEAK and OLD PEOPLE, and RICKETY CHILDREN, who find in it the CALCAREOUS ELEMENTS entering into the CONSTITUTION OF THE BONES. Well adapted to LADIES in the FAMILY-WAY, WET NURSES (whose milk it enriches), and to stop CHILDREN'S DIARRHŒA.

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This Medicine owes its curative virtues to the great quantity of Caffein which it contains. Dr. Wilkes, of Guy's Hospital, declares in the *British Medical Journal* that GRIMAULT'S GUARANA acts "like a charm."

"Grimault's Guarana Powders are a certain remedy for SICK HEADACHE."—The *Lancet*, Aug. 31, 1872.

It is the most valuable remedy against DIARRHŒA, DYSENTERY, and all disorders proceeding from derangements of the Stomach Bowels.

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THE

INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X. CALCUTTA :—SATURDAY, JANUARY 10, 1885. [No. 2.

Crop and Weather Report.

[FOR THE WEEK ENDING THE 31ST DECEMBER, 1884.]

General Remarks.—Rain has fallen in all districts of the Madras Presidency, but nowhere so heavily as during the week preceding that under report. No report has been received from Mysore, and in Coorg there has been little or no rain. Rain has fallen throughout the Deccan and Southern Mahratta Country and parts of Guzerat and the Konkan, where it was needed most, but more rain is still required in parts of some districts. Rain in varying quantities has fallen throughout the Central India States and at some places in Rajpootana. In the Berars there has been good rain, and the weather continues cloudy. No report has been received from Hyderabad. Slight rain has fallen generally throughout the North-Western Provinces and Oudh, and the weather continues seasonable. Except at Lahore and Umritsur, no rain has fallen in the Punjab. In the Central Provinces there have been occasional showers which have proved beneficial to the crops. In Bengal a little rain has fallen in more than half-a-dozen districts.

There is little or no change to record in agricultural operations. Harvesting continues in Madras and standing crops are generally in good condition, except in Bellary and Kurnool where they are in want of more rain, and in Tanjore where they have been damaged by excessive rain and floods.

In Bombay *rabi* prospects have been improved by the recent rain, and in the Central Provinces, the North-Western Provinces and Oudh, and Punjab the condition of the crops is generally very good. The *rabi* crops are also promising in Bengal, where the *aman* paddy is still being harvested, the outturn being fair in some districts. In British Barmah the rice harvest has been completed in some and is well advanced in other districts; the outturn has been satisfactory. The public health is generally good. In Tanjore and Madura the mortality from cholera is still heavy.

Prices are fluctuating in Bengal and the Punjab, but elsewhere generally stationary.

Madras.—General prospects fair; rain in parts of Bellary; prospects not improved in Anantapore.

Bombay.—Rain throughout the Deccan and Southern Mahratta Country and parts of Guzerat and the Konkan; standing crops much benefited in parts of Poona, Ahmednugger, Sholapore, Dharwar, Belgaum, and Kaladgi, but slightly injured in parts of Nasik, Khandesh, Kaira, and Thana; more rain still required in parts of some districts; crops injured by hail in one taluka of Dharwar and 2 of Kaladgi; cholera, cattle-disease, and smallpox in parts of 7 and fever in parts of 13 districts.

Bengal.—Some rain fell in more than half-a-dozen districts; *aman* paddy is still being harvested, and a fair outturn is expected in some districts; *rabi* crops are coming on well, but a little rain would do good; price of rice has fallen in some districts and in others it is stationary; sugarcane-cutting continues; sporadic cases of cholera still continue to be reported from many districts, while fever still prevails in some.

N.-W. Provinces and Oudh.—Weather seasonable with a slight sprinkling of rain here and here; *rabi* crops flourishing; opium promising; and excepting a little sickness in Kumaon, public health is good.

Punjab.—Fever decreasing in the Hissar and Umballa districts, but the health of the rest of the province is generally good; *rabi* sowings completed; prospects on the whole good; prices fluctuating.

Central Provinces.—The weather has continued cloudy with occasional showers which are beneficial to *rabi*; health good; prices steady.

British Burmah.—Except sporadic and trifling cholera and small-pox, public health of province good; harvest over in some districts and well advanced elsewhere, and outturn satisfactory.

Assam.—State and prospects of crops good; cholera and small-pox here and there. Weather rainy; *sali dhan* being reaped; public health good.

Mysore and Coorg.—Standing crops generally in good condition; more rain required, especially in Tumkoor district; prospects favourable; public health good.

Berar and Hyderabad.—Weather cloudy and rainy; *jowari* and cotton crops somewhat damaged.

Central India States.—Health and prospects good; opium sowing finished; prices falling slightly.

Rajpootana.—Crop prospects favourable; prices steady; health good.

Nepal (*Dec.* 25).—Weather fair; prospects good.

Editorial Notes.

THE *Ceylon Times* is glad to see that amongst the new ordinances shortly to be laid before Council, is one for extending the provisions of the Coffee-Stealing ordinance to other and newer products. It hopes it may be comprehensive, and include *all* new products and the plants thereof. A Forest ordinance also is about to be brought forward. Considering the rapid way in which ordinances are rushed through Council, often before the general public are thoroughly acquainted with their provisions, our contemporary suggests that the draft of both those important measures should be published at once, so that those interested may have an opportunity of discussing various provisions contained therein.

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THE *Home News*, alluding to gold mines, says:—The business has this week been largely confined to Indian gold mines, and considerable transactions have taken place in the shares of the Mysore, Nundydroog and Ooregum Companies. Curiously enough, however, Indian shares have been weaker since the receipt of the last telegram from Captain Plummer, of the Mysore Company, which was the most favourable on record, announcing, as it did, a crushing with a yield of three ounces of gold to the ton. There are in the air rumours of reconstructions of defunct companies in the Mysore field, and a meeting has been held of the Dingley Dell Estates Company—a concern in the Wynaad district, but which has also 320 acres in the Mysore district. It is proposed to sell a portion of the latter estate for £10,000, retaining 120 acres. A meeting was also held of the Nundydroog Company, at which the subject of reconstruction was considered. The capital of the new Mysore Gold Mining Company (Limited) is £100,000, in £1 shares to be issued at a discount of 15s. per share. A circular accompanying the prospectus says: "It is proposed to continue sinking the shaft (now 102 feet deep) to the depth attained by the neighbouring Mysore mine, when the same rich deposits are expected to be met with, as the report states that this portion of the Mysore block contains the same reefs, and the first crushing of which mine are as follows—1884—June, 101 tons—result, 52 ounces; July, 85 tons—result, 88 ounces; August, 95 tons—result, 96 ounces; September, 126 tons—result, 128 ounces; October, 94 tons—result, 180 ounces; November, 12 tons—result, 363 ounces.

⁂

AN interesting correspondence has been published by the Government of Madras on the subject of the crude Cinchona bark. It appears that some suggestion put forward in the Administration Report to Government by Mr. M. A. Lawson, Director of Government Cinchona plantations, Botanical Gardens and Parks, Nilgiri, has attracted the attention of the Surgeon-General in that Presidency, who remarks "that the use of the crude bark is very wasteful and expensive owing to the *fact* that infusions and decoctions soon ferment in this country."

Mr. Lawson holds that such a mode of administering the febrifuge might certainly be adopted, but the infusion or decoction would of course have to be made at the time it was required for use ; just as in England an infusion of senna is now made by the poorer classes. But even if this was done, there would still result a considerable waste, inasmuch as a portion only of the cinchona alkaloids is removed by either of these processes. If, however, instead of the bark being infused or boiled it was to be steeped in some weak spirit, such as arrack, the loss of alkaloids would be extremely trifling, for a weak spirit dissolves out nearly the whole. If then a powder of a fairly constant value was made (and this could be easily done), there is no reason why it should not be sold in every country village, and the natives be allowed to obtain, either by instructions or by experiment, the amount of powder necessary for a dose. With respect to the suggestion of the Surgeon-General that the Government Quinologist should give his attention to the preparation of a fluid extract of cinchona, it is said that this is already being done by Mr. Hooper. This preparation contains a definite amount of the cinchona alkaloids in every ounce of the fluid, say 24 grains to the ounce. This preparation, or any other, which the medical profession may determine to be the most convenient, can always be maintained without difficulty. Mr. Hooper's extract, Mr. Lawson adds, is not more unpalatable than the sulphate of quinine itself, and it possesses moreover this advantage, *viz.*, that it may be diluted to any extent with water. The keeping properties of the extract will probably be great, but this is a matter which must be tested by experiment. The manufacture of the extract would be inconceivably economical, and could be carried on equally well on the Nilgiris or in Madras.

⁂

Very few of our readers are aware that there are large tracts of land in the Assam Valley which are classed as "precarious" or "insecure." These tracts are the alluvial or *chapari* mauzahs which extend along both banks of the Brahmaputra, but are also found to cover a large area in the districts of Kamroop and Nowgong. Cultivation is very precarious here owing to their liability to untimely inundation by the great river, or by the numerous creeks and channels which its affluents intersect the country in all directions. The crops they yield are broadcast summer rice (*ahu*) and Indian mustard ; the former is harvested in July and August, and the latter is sown in October and November ; if therefore the rainy season opens with, and is succeeded by, high floods, double misfortune awaits the cultivators ; the rice crop may be lost, and the ploughing for the mustard may be deferred till the season is far advanced. The food crop is the more precarious of the two, but the other is perhaps of greater importance to the cultivator. These lands are not, as a rule, retained longer than three years, after which period the cultivators move their temporary homes to fresh clearings in the reed jungle with which their *chapari* tracts are densely covered. The system of annual settlements is well adapted to fluctuating cultivation of this kind. The mandal prepares his papers on the basis of the area actually cultivated year by year, and the assessment of eight annas a *bigha* represents the share of the Government in the produce raised by the cultivator in that year. If the crop be lost or destroyed there is no remission granted. This at first sight appears to press heavily on the cultivator, but the facts are that total loss in a large area is rare ; that remissions have never been known by them, and to allow them such remissions, would be tantamount to involving complications in a revenue system which works well, because it is extremely simple.

⁂

But some material concessions have been made in favour of the cultivators in the collection of revenue in these *chapari* mauzahs. There has been a general wish on the part both of the ryots and the mauzadars that instead of the two revenue *kists* (15th October and 15th November) there should be a single *kist* in March or April, so as to allow the ryot to gather in his mustard crop before being called in for payment. Under the Assam Settlement Rules, according to Mr. Stack, the October *kist* of three-fifths is levied on all lands which fall into the main settlement, the remaining two-fifths being paid in the January *kist* ; which in the case of *daryabadi* lands, *i.e.*, lands which come into cultivation for the first time in October and November, the whole assessment is taken in the single *kist* of January. To meet these demands on account of mustard lands, the ryot takes an advance from the dealer to whom he sells his crop, repaying the crop at harvest time with interest at 90 per cent per annum ! It must not, however, be supposed that this undesirable state of things owes its origin to the Government demand ; besides, it is doubtful whether any change in the *kist* dates would obviate the necessity of rushing into the arms of the money-lender. Yet the Government think it incumbent to adjust the times of payment of their demands as nearly as possible to the convenience of the cultivator. It has therefore been ruled that in *chapari* mauzahs (mauzahs having one-sixth at least of the cultivated area under mustard,) the revenue demand is to be collected in a single instalment on the 15th February, which would not necessitate his borrowing at all ; but if he did, it will be for a much shorter time, and he will have to pay one or two months' interest, instead of six or seven as heretofore.

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From the returns of the rail-borne trade of the Berars, it appears that the total imports during the quarter ending the 30th September amounted to 332,041 maunds and the exports to 241,950 maunds. The trade, which is mainly with Bombay and the Central Provinces, showed the usual falling off for this period of the year,—a falling off chiefly due to the occurrence of the rains. The decrease amounted to 367,122 maunds, or 52·5 per cent in the imports ; and 996,552 maunds, or 80·4 per cent in the exports. Nearly half of the decrease in imports was due to the salt trade, which fell from 191,232 maunds to 11,056 maunds. In exports the decrease was principally under cotton raw (282,816 maunds), wheat (217,681 maunds), and linseed (465,681 maunds). In spite of this decrease, the trade of Berar shows a considerable advance on previous years.

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The following is abbreviated from an article by Herr Em. von Proskowetz, jun., in the *Wiener Landwirthsch Zeitung*, quoted in the Berlin *Deutsche Zucker Industrie* :—About two years ago a very experienced German cattle-dealer drew my attention to feeding stock with molasses, assuring me that the flesh of cattle thus fed was particularly well flavoured, and the fat firm. My first attempt was a small one, but last year I tried the system on a larger scale, and as I had every reason to feel satisfied with the result, I think it my duty to give information on the subject. This year I intend to feed all my stock in a similar way, although probably to an increased extent. Last year, of 110 oxen, treated under identical conditions otherwise, the 60 which were fed with molasses increased in weight on the average 7⅕ oz. a day more than the 50 to which molasses was not given. A most important point in feeding with molasses is the manner in which the food is prepared. As far as I could ascertain, the molasses has usually been more or less thinned with water, even to the extent of giving the animals the mixture to drink. I feel, however, confident that, at all events where the stock consumes much beet refuse and the like, this thinning process has been the cause of many failures in successfully feeding with molasses, owing to the laxative effect. Acidification, especially in wooden mangers, easily sets in ; and the same quantity of sugar dissolved and undissolved will act very different. According to my observation, which I admit only extends over a short period, the molasses is best when not thinned ; indeed, the greater the concentration the better. It should be mixed as thoroughly as possible with the food, and the cattle take it readily, leaving none. Cleanliness is very important. It is better not to give the cattle salt, when fed with (beet) molasses, and water should be sparingly administered."

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The *Home and Colonial Mail* says: "Our Commissioner in the Lane draws attention in his weekly report to an expression of dissatisfaction in the sales this week at the number of small breaks. We have also received a complaint from a correspondent on the same subject, and we cannot help expressing our opinion that, from a buyer's point of view, it would be desirable to have an alteration. But there are two sides to every question, so it must not be over-looked that a selling broker has to carry out the instructions of the importer, and if an invoice of tea be given him to sell, which includes a few single packages of Pekoe Dust or Fannings, which the planter has packed off out of the way, there is no alternative but to print them, and get the best possible price for them. We can see, however, by the tone of our correspondent's letter that more or less irritation is caused by small breaks being offered in the large sales, and it would be well if the selling brokers could see their way to meet the wishes of the buyers by withdrawing all non-sampling breaks, and selling them at their own sale-rooms afterwards. A much more satisfactory way out of the difficulty would be for planters to hold back all lots of less than twelve chests, and include them in a subsequent shipment bulked in with the tea of the same grade. We have always tried to hold the balance fairly between buyers and sellers, and we have never ceased to regard their interests as identical, if they could only see it for themselves. We believe that this trifling matter may quite easily be arranged if there be the desire on both sides to avoid friction. It is neither dignified nor business-like that such disturbances should be continually taking place in the Indian Tea sale-room. The buyers have certainly some grounds for complaining, seeing that the precious daylight so soon goes now in the afternoon, and it cannot fail to irritate those who are heavy operators, if they are obliged to 'sit like Patience on a monument' when they might be usefully employed elsewhere in extending the franchise of Indian tea, or promoting redistribution to the remotest village in the land."

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WITH the following notes, we conclude the article on "Sugar Bounties" from the *Fortnightly Review*:—In this matter of sugar bounties alone, no English taxpayer would for a moment hold his peace. He would bluntly say, "Either this making of sugar from beet pays, or it does not. If it does, I am not going to contribute to the profits of the manufacturers; if it does not, I refuse to make them good their losses." But the foreign taxpayer holds his peace; and, whether it be in ignorance or in fear, it exhibits an equally lamentable absence of the primary conditions of individual freedom. And the evil lies deeper than is ordinarily acknowledged. Assume that the sum obtained in bounties exceeds £2,000,000 in the year; this means that the manufacturer has paid in sugar duties £4,000,000, and when he exports the sugar he receives £6,000,000. Thus, in addition to the £2,000,000 extra for bounties, the taxpayer has also to provide other revenue to the amount of £4,000,000 to make good the withdrawal of that amount from the yield of the sugar duties. In addition to this, there is the drawback which has to be provided and paid on sugar which by various processes, even of direct fraud, has never paid any duty at all. The system thus costs the continental taxpayer over £6,000,000 direct charge in the year, or the equivalent, even according to the English yield, of something like 4*d.* in the pound of income-tax.

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BOUNTIES, being only obtained on exports and with the aid of high import duties, by one and the same stroke drive out of the country all sugars produced in it, and also curtail supplies from abroad. One consequence is that the consumer has to pay more in these bounty-giving countries for even his own "national" sugar than is paid for it by the foreigner. The Parisian, for instance, is now actually paying 8*d.* for French sugar which the "perfidious Londoner" is only paying 3*d.* for. Another consequence is, that the consumer obtains a worse article. English refiners know well that their weakest and worst sugars go to the highly "protected" countries; and just now in Marseilles and Nantes, the weakest and worst of English refined sugars are being retailed at high prices, because by reason of their very badness they can enter at the lowest rates of duty. The *reductio ad absurdum* is attained in the new French law, under which it appears possible for an English merchant to buy Paris-made sugar in the low-priced English market, and send it back to Paris and sell it there at considerable profit. Consumers in most continental nations, mildly and without the slightest protest, pay twice as much as they need for all their sugar; and in addition, and in order to keep going the system that compels these prices, they contribute a revenue sufficient of itself to pay for some "glorious little war." Some authorities in our own manufacturing districts have pointed out that our general exports to certain bounty-giving countries show a significant falling off as sugar bounties increase. This is further evidence of the fact that bounties impoverish the countries that allow them, as they are so much out of the pockets of the people which might otherwise have been invested in profitable exchange or production. The one result they can boast is that an industry is thus kept alive which could either live by itself, or else is a dead loss to the community as a whole. But this plain truth is allowed to pass unheeded, because the losses are distributed ove the whole community, whereas the profits are concentrated on a few individuals. What is seen is small, but all profit; what is not seen is enormous, and all loss. Would there was another *Bastiat* to show this to those whom it concerns! Experience teaches us hardly to expect it in a republic, but in a monarchy we might hope some native Cobden would arise in defence of the many against the few—in defence of the national prosperity against that which a small class of individuals "surreptitiously abstract from the pockets of too-confiding fellow-countrymen."

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BUT the day seems not far distant when these scales will fall from the eyes of foreign nations, more especially as their treasuries come to feel the pressure of the system, and can thus influence the Governments to appreciate the consumer's losses. In each beet-growing country in turn, in Austria, Holland, France, and Belgium—it comes to be found that under this strange system, the greater the output of sugar the less the net yield of sugar taxes. And now Germany is feeling the pinch. In 1882 the net sugar revenue was £2,300,000; in 1883, the output was 20 per cent larger and the nett *yield* 30 per cent less, being only, £1,500,000. Progress on this ratio will in two years result in actual deficit. All this bouleversement of these important industries is wrong and unprofitable; the evils incidental to the system, if reduced to a money standard, clearly and materially outweigh any advantages from the strictly English no less than from the international point of view. Even in these vaunted low prices, the difference is none the less made up by the consumers to the producers, although it is, in taxes, and not in trade payments.

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WE may now give a fuller definition of the evil that lurks inherent in the bounty system; we find it to be, as it were, hydra-headed.

The bounty system—

I. Is an artificial interference with the industry of sugar-making, hampering production, exchange, and consumption.

II. Has caused gratuitous over-production and glut, leading to a ruinous fall in prices.

III. Is forcing many people to use that sugar which it costs much to produce to the exclusion of that which it costs least to produce.

IV. Enables growers of expensive sugar to hold their own against growers of less expensive sugar.

V. Causes a dead loss to aggregate national wealth, and thus arrests general progress.

VI. Severely strains international comity, and checks the advance of free exchange among nations.

VII. Impoverishes those nations which allow it—

(*a*) By raising the price of refined sugar to the local consumed.

(*b*) By raising the price of raw sugar to the native manufacturer, and lowering the price to his foreign competitor.

(*c*) By forcing the taxpayer to contribute millions sterling a year to make up the losses or at best increase the profits of a small class.

(*d*) By forcing the taxpayer to make up by other sacrifices the deficit caused in the revenue derived from sugar.

(*e*) By supporting at the public expense an industry which is either unprofitable or could stand by itself.

I would conclude by a brief statement of a remedy which shall be at once practicable, desirable, and effectual. The Select Committee of the House of Commons in its report declared distinctly that "they felt themselves precluded from recommending" a countervailing duty, but that "the most effectual mode of stopping bounties is manufacturing and refining under excise supervision;" and that this could be put in practice by summoning a Conference of the sugar-producing Powers. Manufacture under excise supervision means that no sugar will be consumed on which duty has not been paid, either on issuing from the factory or on import. No bounties are possible under this system, as was proved when it was tried in England. This, then, is the remedy, and that it should be political rather than economical is a natural consequence to the fact that the evil is political in origin, although economical in effect.

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Finally, as to the measure necessary to its application. The Governments of European countries are, and have long been, desirous of putting an end to the bounty system, and there have been several Conferences held with that end in view. They have discussed and condemned various palliatives, and on separating from the last Conference in 1877, they had so far come to a general conclusion that manufacture under excise supervision was a good and complete remedy. The hitch lay in obtaining a general assent to the institution of the system. Would all the countries bind themselves in solemn convention to the one system? That is a question which has not yet been answered, and which can be answered at a new Conference. All the countries concerned have endeavoured, within their own borders, to put an end to the system. Austria did so by establishing a minimum of contributions to the revenue from the sugar duties, drawbacks (and so, bounties) only being allowed after that minimum had been paid in. Belgium has followed suit France some time ago halved the sugar duties, which incidentally halved the bounties, and made them intrinsically little more than nominal. Germany recently determined thus to follow in the wake of France. But there was no security that these arrangements would last; there was no common compelling power; and France, as if to prove the justice of these fears, has suddenly gone off at a tangent, and in alleged protest against the heavy German bounties, has again established a system of bounties larger than those obtained in Germany. In this war of bounties all must lose.

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I have on a previous page summarised several of the evils the system brings on foreign nations. If this list, supplemented as it easily might be from local experiences, was taken to heart by the taxpayers of France and Germany and the other beet-growing countries, there might be some possibility of awakening the individual from his suicidal torpor, and at once forcing and enabling the Governments of those countries to meet together in a new Conference, and sign a common convention to "manufacture under excise supervision." One word remains as to a common compelling power, and the crucial question as to how recusant States are to be dealt with. In the first place all the States may agree to sign; and this can only be discovered on the actual assembling of a new Conference. But although there is good reason to hope for this, nevertheless it is conceivable that some one or other Government may not see its way to signing some particular convention. Against such recusant States two penal clauses have been suggested for insertion in any convention. These are, a countervailing import duty to be placed on all imported sugars that have received a bounty; and the other, absolute prohibition of all imports of sugar from countries where bounties are allowed. It is held that neither of these clauses could be or would be accepted by England. I ask, need they be even so much as proposed at a Conference?

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The Conference is called to put an end to the bounty system. The convention it could adopt might contain three simple clauses to the following purport:—The signatories bind themselves individually not to allow bounties to be obtained on sugar within their frontiers, and they will make it penal to obtain drawbacks even one farthing in excess of what has been paid in duties. The signatories declare bounties on export to be contrary to the most-favoured-nation treatment; and that any article obtaining a bounty on export is, *ipso facto*, excluded from the most-favoured-nation treatment in all existing treaties. The signatories bind themselves, whenever they wish to raise revenue from sugar, only to allow manufacture or refining under excise supervision. The first and third of these clauses need no comment; the second may be termed a codification of a point in International law, and it will be observed it leaves the signatories perfectly free in their particular method of action in regard to recusant Powers, but it places those Powers entirely at the mercy of the signatories. I venture to suggest that by such a convention the evils I have defined as inherent in the bounty system would be once and for all arrested, and England and the Continental Powers equally relieved of an industrial incubus that is sucking the life-blood of profit out of all undertakings—agricultural, manufacturing, or commercial—that have any connection with sugar.

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The following notes by Mr. E Stack on silk in Assam will be read with great interest:—Some misapprehension seems to prevail among English silk-spinners with regard to the nature of the silkworms which furnish the silks of Assam. I find the domesticated *muga* and *eri* included in Mr. Wardle's pamphlet on the wild silks of India, while in a lecture on silk-spinning delivered in the Technical College, Glasgow, the tusser worm is alluded to as generally cultivated in this province. A similar misconception (so far as Assam is concerned) appears to pervade the Resolutions of the Government of India of the 23rd November 1875 and of the 28th February 1879, directing attention to undomesticated silk-spinning worms in general and to the tusser silkworm in particular, and asking for certain information regarding them. The information required will be found in the second part of this Note; but in treating of the silks of Assam it is desirable to make it clear at the outset that from the wild silkworms of Assam, as they now exist, nothing whatever is to be expected. They may possess a scientific interest, but they are certainly destitute of all commercial value, present or prospective. Their cocoons in the wild state are not to be found in numbers anything like sufficient to repay the cost of collecting, or to furnish the slightest hope that they will ever be able to supply the English market. It is exceedingly doubtful whether by the most strenuous efforts one hundredweight of wild cocoons of all sorts could be collected in the whole of the Assam Valley. The commonest of all is the variety of tussur called *kutkuri* in Assam, and this is so rare that virtually one never hears of it. In times previous to British rule, this worm used to be cultivated to a small extent in the vicinity of Jorehat, but it has long fallen out of fashion, and in 1877 the Chief Commissioner of Assam (Colonel Keatinge) was of opinion that to attempt to create a tusser silk industry in this province would be simply to court failure. More recently the failure of Major Coussmaker's operations in the Deccan has proved the futility of attempting to make anything out of tusser in Assam, where it is vastly less abundant. Such being the prospects of tusser, it is hardly necessary to speak of the other wild worms of Assam. Eight species are described hereafter, whereof three are the wild varieties of the *pat*, *muga* and *eri* worms, and none of them are turned to any practical account, though cocoons found by chance in the jungle may occasionally be brought home by the cultivator and reeled or spun together with cocoons of his own brood. In the wild state they occur but sparingly, their principal habitat being the dense and unpeopled jungle of the submontane tracts, while the possibility of domesticating them in Assam need not be considered for a moment. It is not to be expected that the Assamese, who take so little care and trouble with the domesticated worms they have already, could ever be induced to make experiments with a new species, nor is there any reason to believe that the produce of the wild worms, even if successfully cultivated, would prove in any way superior to the existing silks of the country.

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Dismissing the wild worms, therefore, from consideration altogether, we have three kinds of domesticated worms in Assam, or rather, it may be said, in the Brahmapootra Valley, for the Surma Valley is not generally a country of silk cultivation These are the *pat* or mulberry worm (*bombyx textor*); the *muga* or *sun*-feeling worm (*antheræa Assama*) whose cocoon, like that of the *pat*, can be reeled; and the castor-oil worm (*attacus ricini*) yielding a silk which is never reeled, but spun by hand. Looking simply to their commercial potentialities, these three species of silkworm may at once be reduced to two, by striking out the mulberry worm (*pat*) on account alike of the costliness of its silk, the scantiness of the present supply, and the difficulty of extending its cultivation. The two remaining species, the *muga* and *eri*, present a much more hopeful field of enterprise. They are produced in considerable quantity already, they are thoroughly adapted to the climatic conditions of Assam (being, indeed, probably indigenous to this part of India), and there is no obvious reason why their cultivation should not be capable of immense development. The *eri* is the more promising of the two, both because it is cheaper and more abundant, and also because, being reared entirely indoors, its cultivation does not entail that troublesome necessity of watching by night and day, which is imposed upon the *muga* breeder during the period that his worms are on the trees. The *muga*, indeed, yields the finer silk, but as it is only in the roughest shape that Assam silk can hope to become an article of demand in the English market, the difference of quality will, perhaps, prove to be a matter of secondary importance.

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There are two forms in which a silk trade is conceivable between Assam and England. We may export the thread, or we may export the cocoons. It may be said at once that the export of thread would never pay. *Muga* thread is now selling at about Rs. 8 and *eri* at about Rs. 5 the seer (6s. *8d.* and *4s. 2d.* the lb.); and when it is remembered that the reeling is of the rudest character possible, that the thread is coarse and uneven, and that no two skeins as a rule will be found to correspond in quality, it will easily be understood why *muga* is incapable of competing with the finer and not more expensive silk of Bengal; and, indeed, in Bengal itself the silk-reeling business has for some time been in a stationary or decaying condition. *Eri* thread is still more "uneven, gouty, and knibby," and would probably regarded by the English manufacturer as unfit for employment for any purpose. From the export of cocoons, on the other hand, there may possibly be something to hope. The manufacture of silk plushes and similar fabrics out of waste cocoons imported from India or China is a flourishing branch of the silk industry in England, and although China has hitherto been the principal source of supply, there is no reason why Assam should not contribute large quantities of an article which is produced with so much ease in the valley of the Brahmapootra.

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The kind of thing that is wanted is described in the following words by one of the English gentlemen engaged in its manufacture:—

> The class of silk called *spun* silk is made by a combing and carding process, out of the refuse of *thrown* silk, and out of cocoons that are damaged and not windable, and out of *pierced* cocoons, as we name those from which the moth in the order of nature has escaped. It is in this latter condition that I think wild silks should be found somewhere in India, and this is what I principally want. I do not wish to wind such silk, but to *spin* it into fine thread. It does not matter how broken and rough it may look, or how much it is knocked about, torn, or crushed. I only want it as free as possible from the dead bodies of the worm, and of such foreign matters as sand or branches. It will not look like silk at all, till the gum and dirt are boiled and washed out of it. You observe I ask nothing from India that requires skilled labour or machinery; only to collect the raw material in a state in which it must be almost valueless in India, and let us by our superior mechanical appliances make something of it here. * * * *Eri* I like best for its whiteness. I believe it breeds frequently, but I do not believe any amount of cultivation could get *thsown* silk out of it. I mean, of course, to be of any commercial value. * * * *Muga* is darker than *eri*, but has some other properties that are valuable, principally as a *spun* silk. * * * No *eri* or *muga* waste cocoons have, as far as I know, ever been sold in the London market. I only know of trifling samples having been tried, too small to base any value upon. * * * *Tusser* waste silk, however, is regularly sold in London. It comes both from India and China; the price is about 1*s.* 6*d.* the pound, and it is very dirty. I should say the *eri* and *muga* would be much more valuable.

In a letter from another firm engaged in the same business, I find the raw material described as "pierced or spoilt cocoons, —cocoons from which the moth has worked itself out and escaped," while cocoons with the chrysalis inside them are not wanted at all.

Now, in comparison with other parts of India, Assam seems to possess superior capabilities for supplying a demand of this nature. The conditions of tusser cultivation in Bengal, as described by the Commissioner of Chota Nagpore (supplement to *Calcutta Gazette* of 31st October 1883) appear much less favourable than the conditions of *muga* cultivation in this province. He calculates that a man can tend fifteen trees yielding 450 cocoons in an ordinary, and 1,500 in a bumper year, such as occurs occasionally: and the selling price of the cocoons is 160 the rupee. The *muga* cultivator in Assam would obtain more than 3,000 cocoons from an equal number of full-grown *sum*-trees, and the price of the whole cocoons is about 600 the rupee. It follows that Assam ought to be in a much better position to supply cocoons to the English silk-spinner than the principal tusser-producing districts of Bengal. If a similar calculation be made with regard to *eri* cocoons, the result appears still more favourable.

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No attempt seems ever to have been made to develop the cultivation of *muga* for the English market, but we have the record of Mr. C. H. Lepper's experiments with *eri* in the Lukhimpore district about 1872-73. Mr. Lepper was commissioned by Messrs. Lister & Co. to take up land, and try the experiment of rearing the *eri* worm on a large scale, so as to thoroughly prove the practicability of procuring silk of sufficient quantity to make the business pay. His choice of a site in the southern portion of Lukhimpore was perhaps an unfortunate one, as the worm is much more widely cultivated on the confines of Kamroop and Durrung. He found the climatic conditions exceptionally favourable, the supply of food abundant, and worm so peculiarly adapted to breeding as to suggest the belief that with proper care a constant rotation of crops could be obtained, so that the operations of breeding and spinning might go on uninteruptedly all the year round. Some experiments made with the cocoons also pointed to the possibility of considerably improving them in size and quality. But the difficulty of procuring labour, and its costliness when procured (local labour being quite inefficient) were so great as to deter him from advising Messrs. Lister and Co. to continue operations. His own estimate was that the cost of suitable buildings on even a moderate scale, to replace the native style of house, which is not proof against damp, rats, or insects, would not be less than £3,000. A similar attempt was made some six years ago by a European in the neighbourhood of Rangia, in Kamroop, but he was compelled to abandon it after losing his entire crop by disease.

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In the face of these precedents, the prospect of *eri* cultivation on a large scale, either by the Government or by private enterprise, is not encouraging, and the difficulties are still greater in respect of *muga*. But the case is different with the native breeder, who spends nothing, and therefore can suffer no loss. Were a market once opened for *muga* and *eri* cocoons at fixed rates and in unlimited quantity, it is probable enough that the cultivators would be glad to bring their cocoons to it, and that under the stimulus of a regular and certain demand, the supply would soon begin to increase. Only the waste cocoons—the perforated cocoons through which the moth has been allowed to eat its way—would be required, and the seller would not even be put to the trouble of boiling his cocoons as he does now before offering them for sale. The practicability of getting up a supply for the English silk-spinner in this way depends, of course, upon the price which he finds it worth his while to offer for the article supplied. In November 1883, I despatched a small consignment of *eri* cocoons to a silk-spinner in England, who has sent me samples of the yarn prepared from them, and asked for a large supply. It is not safe to enter into any minute calculation in these matters, but it seems to me that a price of 1s. per pound for either *eri* or *muga* cocoons in London would repay the exporter. The great want at present is free communication between the exporter and the producer. The indolence and suspiciousness of the Assamese ryot have to be overcome, and this can be done far better by private enterprise than by Government agency, though the latter may be able to help private enterprise in pushing its way in Assam. As it is, the demand for waste silk in England has already begun to attract a trade in *eri* cocoons, and some 400 to 500 cwt. are exported annually from Goalpara to Calcutta for shipment to London, but this supply is very far from adequately representing the productive capabilities of the Assam Valley.

The following extracts from "Indian Fish and Fishing," by Francis Day, F. L. S., Indian Commissioner at the Fisheries Exhibition, are well worth reproducing for the benefit of our readers. The result of the investigations I conducted in India led me to conclude that wherever a good local demand existed for fish, the fishermen were in a prosperous condition. Wherever salt was dear the fish-curers' trade was restricted or destroyed, and as a result the fishermen were in a depressed state. That fish salted with taxed or monopoly salt is a luxury for the rich, the sick, and for export; that such as is prepared with salt-earth keeps badly and predisposes to disease. That in many localities where the salt laws were rigidly enforced the poor had to consume their fish putrid, or simply immerse it in sea water and then dry it in the sun. In short, it was patent to most that the depressed condition of the fishermen and fish-curers' trades was to be found in the incidence of the salt-tax, and that those who deprecate any interference with the poor fishermen, on the ground of their miserable state of destitution, must be unaware of their real condition. One cannot suppose such advisers to be oblivious of the distresses of those among whom they reside, or would desire to feed the poor on putrid fish, on the consideration that the realization of the salt revenue is of much greater importance than the lives, health, and comfort of their fellow-creatures. Assisting fishermen with money, boats, and nets would be insufficient to place the sea-fishermen and fish-curers' trade in a healthy state, while, if it is in a healthy condition, such advances are unnecessary. Expensive salt is beyond the reach of the majority of the fish-curers, it is ruinous to their trade, and in the ruin of the fish-curer the fishermen must eventually participate. It is to be hoped that the endeavours now being made to reintroduce prosperity among this numerous class will be productive of the greatest benefits not only to themselves, but by augmenting the food for the general public.

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Fresh-water fisheries differ in many respects from marine ones; while, wherever any quantity of fresh water exists in the East, there we are almost certain to find fish, and this from a sea-level to nearly the summit of the highest mountains. Consequently fishing is had recourse to, in various manners, in rivers, irrigation canals, lakes, tanks, ditches, inundated fields, and swamps. The importance of such fisheries is not solely in a ratio as regards their productiveness, but also in accordance with the character of the adjacent people as to whether they are or are not fish-consumers; while the sparsity or the reverse of the population has also to be taken into account. Should no regulations be in force for the protection of inland fisheries and other circumstances be equal, that district which is most densely populated by man will be least so by fish. Individuals can more readily live by fishing than by agriculture, as the trouble of capturing the finny tribes is considerably less than that of tilling the soil. But unregulated capture is simply catching food without a thought respecting future supply. Fish have been endowed with certain means of increase and protection; the number of their eggs may be enormous and sufficient to counterbalance natural waste. The operations of man, however, are in excess of natural waste, consequently such a destructive agency requires to be kept in some check. In India certain forms of fish keep guard over their eggs, and likewise over their fry, in order to afford them protection from their enemies. When man increases, watery wastes (wherein the fish had been protected by grass, reeds, bushes, and the roots of trees) become drained and cultivated; predaceous man increases his means of destruction; an augmented population, possibly assisted by the unscrupulous manufacturer or miner, pollute the previously wholesome water, and a diminution of the finny tribe becomes apparent to the investigator.

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With an increasing fish-eating population, an increased supply of fish is a self-evident necessity, and this must be provided for by augmented captures or dearer prices, the latter acting as a check on the poor, by more or less placing it out of their reach. This latter result may, consequently, eventuate in gradually diminishing the physical strength of the people by decreasing their food, a proceeding which will scarcely bear examination. It is clear that a greater supply must be met from one or two sources, either from fisheries which previously have been insufficiently worked, or by overworking such as exist, by means of capturing, for present use, those which ought to be left for a future season. Even if the extent of the water is so great, and the contiguous inhabitants so few, that this result need not be anticipated for several generations, still populations, under good systems of government, have a natural tendency to increase. Means of carriage generally improve with time, and should neither regulation nor care of the fisheries be attempted, disastrous results must eventually be arrived at, unless the finny tribes by means of artificial propagation are kept up to the required numbers. Fish appear to have but few friends but many enemies, and investigations as to their condition but too frequently end in giving increased license to their captors. We see interested parties and philanthropists (so-called) exclaiming against the hardship to the poor in not allowing every available fish to be secured. The majority of our law-makers are content to allow fish to shift for themselves, and to leave the fishermen to be controlled simply by their own consciences. To-day's market it is hoped will be supplied; sufficient for this season, it is believed, may be obtained, so to-morrow's wants are left to be met as they can, until the time arrives when depletion of fisheries becomes obvious, when, if the fault cannot be laid upon meteorological or other conditions, something has to be attempted.

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In Native States fish have obtained great consideration, more so perhaps in ancient than in our own times. Thus, in Mysore, in the time of Hyder Ali, very stringent fishery laws existed; whereas, at the present day, about two-thirds of the population of some divisions of the country occasionally add fishing to their other occupations, nearly every villager possessing a fish-net or trap, to be employed as occasion or opportunity arises. Now fisheries are open to all; a fisherman's calling is no longer a profitable one, mainly due to the fisheries being depopulated. When whole districts were let to contractors, they were not so short-sighted as to permit an indiscriminate destruction; but now everybody does as he likes, when he likes, where he likes, and how he likes. Thus, it has come to pass, that among the animal productions of India fresh-water fish meet with the least sympathy, and the greatest persecution, many forms having to struggle for bare existence in rivers which periodically diminish to small streams, or even become a mere succession of pools, or in tanks from which the water totally disappears. They have their enemies in the egg stage, in their youth, and during their maturity; but among these man is their greatest foe, as any one who desires a fish diet captures these creatures whenever and wherever he gets the chance, irrespective of season, age, and size. In certain districts they simply appear to exist solely because man and vermin have been unable to destroy them.

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Fisheries may be let to a contractor, and if their extent is large, he takes partners or sublets portions; sometimes he employs servants, who are paid partly in money, or food, clothing, and lodging, and partly in a share of the captures. In some districts the fisheries, or a portion of them, are declared free, but a license fee is charged to the fishermen. Or the general public is permitted to take fish for home consumption, but not for sale. Lastly, no regulations at all may exist, due to the general poverty of the fisheries, peculiar difficulties in their capture, or the general impecuniosity of the inhabitants. When the public have more or less depleted fisheries, the fishermen become poorer and poorer, unless they turn to other sources of obtaining money; at first, no doubt pleased at the remission of rents and the removal of all restrictions upon fishing, they employ redoubled energy, and thus augment their immediate profits. But soon the general public find that nothing precluded their fishing in any way they please; the markets become glutted, and the price may fall from the want of purchasers. But after two or three years fish become scarcer; fishing is no longer remunerative; removing the rents from fisheries, and throwing them open to the public will not decrease the price of fish. The rates ruling in India are comparative to what obtains for meat and other articles of animal food. Fishermen living on free fisheries, do not dispose of their captures below market rate, any more than farmers who possess rent-free farms sell the produce at less than their neighbours; while, perhaps, of the widest spread fallacies of the present day, is that permitting fisheries to be free of rent and unrestricted by regulations, is beneficial to the fishing population. If the fisherman benefits, the purchaser does not, and their misapplied energy eventuates in nothing but small fish remaining. The young have to be raised from ova of such as are merely one or two seasons old, while the younger the parent the smaller the eggs, and this is probably one mode in which races of fish deteriorate.

AGRICULTURAL BANKS IN THE MADRAS PRESIDENCY.

A FEW months back some of the residents of Cuddalore, in the Madras Presidency, had memorialized the Indian Government, on the subject of establishing an Agricultural Bank in that part of the country. The Government of India desired to be informed what special facilities and powers the memorialists wish to obtain in the matter of the establishment of these Banks, at the same time asking the opinion of the Madras Government on the memorial. A reference was made to the promoters of the scheme, who submitted that the special powers and facilities which they deem essential to the success of their enterprise, and for which they desire to have legislative sanction, are seven in number and are as follows:—(1) That the advance made on the security of lands by this Bank should have priority over other encumbrances except that of Government dues; 2) That the claims of persons having prior lien on the property, on the security of which this bank has advanced any loan, should be set aside in a Court of law, provided that the bank has invited such persons by means of advertisements, or in any other way the Government may determine, to state if they have any claim upon the landed property, and, in the absence of information of any such claims, the advance has been made; (3) That the Court be authorized to enforce the terms of any document for the recovery of advances made by this bank by summary process, provided the bank has taken the precaution of registering such documents and paid the advance-money in the presence of the registering officer; (4) That the bank be authorized to proceed in the manner provided in Act II of 1864 or VIII of 1865 for the recovery of advances, provided that the documents are duly registered; (5) That the tahsildars be authorized to give information to this bank of any default in the payment of Government dues on lands mortgaged to this bank, provided that this bank has given due notice to the tahsildars of the transactions in question; (6) That the bank be authorized to sell by public auction moveable property pledged to them as security for loans in cases of default of repayment of the loans within the stipulated time, provided that due notice has been given to the owner thereof; (7) That this bank be authorized to deposit in the Government Treasury all securities deposited with them as mortgage for loans. The Collector of South Arcot and the Director of Revenue Settlement and Agriculture are of opinion that some of the concessions asked for might be granted without compromising the existing laws on the subject, so that while the interest of the ryot was respected the wishes of the promoters would be met. The Board of Revenue, however, throw cold water on the scheme, by remarking that Act XIX of 1883 (Land Improvement Loans Act, 1883), under which money can be borrowed from Government upon very liberal terms, will probably meet the requirements of those agriculturists who may be willing to take loans upon definite terms in regard to repayment. It is unlikely that the petitioners will be prepared to make advances upon terms so liberal as those contemplated by Government under the new system, and since the concession which they seek in favor of the Association would place the Bank in a position not very different from that occupied by Government in regard to recovery of loans, it seems improbable that resort would be had to the Company in preference to Government. The Government of Madras in reviewing the proceedings of the Board and the correspondence on the subject observe:—The two most important privileges asked for by the memorialists to enable them to lend money to agriculturists at low rates of interest are (1) that the claims of the Bank should be declared to be the first charge, after revenue due to Government, on land mortgaged as security for its loans, provided that no prior claims are brought forward, within a time to be specified, in pursuance of a notice inviting claims issued by the bank before accepting the security; and (2) that the loan, when not repaid on the due date, shall be recoverable by summary process by the Courts, if the document evidencing the loan has been registered and the money lent paid in the presence of the registering officer. Mr. Wilson is in favor of granting both these concessions, and specially approves of the proposal to give registered documents the force of decrees of Courts.

As regards the first of the proposals, the Government do not think that a general notice would give adequate protection to third parties. Notwithstanding the stringent provisions as to the publication of notices of revenue sales under Act II of 1864, it sometimes happens that parties interested know nothing of what is going on and lose their rights in consequence. The proposed operations of the bank are not to be confined to loans for land improvements; but it is the fact that the land is to be improved by the expenditure of the loan, which alone justifies the preference given to the loan debt above all other charges on the property. For land improvements, the Government are ready to lend at very low rates, and the bank is not required at all. His Excellency the Governor in Council is also unable to accept the proposal to give registration the effect of a decree of a Court Registration can secure the genuineness of documents, but the registering officers cannot settle such questions as the right of the borrower to charge the property, the true interpretation of the document, or the plea of satisfaction in whole or in part. It is impossible to take away from debtors the power and opportunity of raising these questions; and if they are to be dealt with by the Courts before issue of execution on the document, the procedure might as well be by regular suit. Similar objections apply to the proposal of the memorialists to enforce the terms of loans by process under Madras Act II of 1864 or Act VIII of 1865. The memorialists say nothing as to superintendence or restriction of their operations, except that the rate of interest to be charged shall not exceed 9 per cent. It is evident, however, that very considerable powers of inspection and interference will be required to prevent abuse. The suggested restriction as to maximum interest could be readily evaded. In view of these considerations, the Government of Madras are decidedly of opinion that the bank should not be granted any privileges involving interference with private rights. The agricultural population of this Presidency are not in such a state of impoverishment and indebtedness, nor is their need of assistance so great, as to require legislation of such an exceptional character. The provisions of the Transfer of Property and Registration Acts secure sufficiently complete registration of documents affecting interests in land, and render it easy for the bank to ascertain the existence or non-existence of prior charges. The risk of false claims being set up, which is the basis of the proposed concession, is not great. Reasonable facilities might, however, be given to the bank to search the registration books, and the registration fees might perhaps be remitted in their favor. The Revenue officers might be instructed to comply with applications for information as to the revenue due on lands offered as security. The Government would also not object to valuable securities belonging to the bank being deposited for safety in Government treasuries. The bank might be empowered to sell immoveable property mortgaged to them on their own responsibility, as is provided by Section 69 of Act IV of 1882, and like power is already provided for as regards moveable property by Section 176 of the Contract Act. But the grant of any privileges affecting directly or indirectly private rights might, in the opinion of his Excellency in Council, have an effect the reverse of what is intended; and, by rendering titles to landed property more uncertain, raise the rate of interest for loans not obtainable from the specially favored bank.

THE BENGAL HARVESTS.

We have seen that the Government has brought forward, at the last moment, and without any enquiry of its own, an estimate of the Famine Commission, to the effect that the annual value of the gross produce of these Provinces is 103½ crores of Rupees. It tells us that this estimate was subjected to the examination of a Committee of 'experts,' meaning thereby, of course, that some trust may be placed in it, although it is obliged to follow up this assurance by admitting that the value of the dairy produce (35 crores) has been omitted therefrom. We should have heard nothing of this omission, but for the pointed attention the *Statesman* has repeatedly drawn to the fact, that in all these estimates our 'officials' have uniformly failed to take the dairy produce into the account. The worth of the estimate and of the checking to which, we are told, it was subjected by 'experts,' may be accurately guaged by this naive confession. But it is not the dairy produce only, that has been lost sight of, but the fact that the Provinces produce some 30 crores of exports a year! The Government is badly served by its Secretaries, or these astounding blunders could not occur.

Let us now revert, however, to this famine estimate, that the gross value of the harvests is 103½ millions a year, and pass by for the moment all notice of the dairy produce and the exports. We are then confronted with the following astonishing fact, that these 'experts,' whoever they were, arrived at the conclusion that, with 70 millions of people to be fed, and 70 millions of acres under tillage, the harvests of 1883 are just what they were ninety years ago when the population was but 25 millions, and the area under tillage comprised but 30 millions of acres, where there are now 70. For if the reader will turn to Mr. Colebrooke's treatise at page 15, he will there find that Mr. Colebrooke estimated the gross harvests of that period to be as follows :—

Gross harvests, 1793-94.

Mans..	*Rupiyas.*
150 000,000 of rice, wheat, and barley, at 12 annas	112,500,000
60,000,000 millet, &c., at 8 annas ...	30,000,000
90,000,000 pulse, at 10 annas... ...	56,250,000
	198,750,000
Seed reserved for the following season, 43,000,000 mans	28,380,000
	227,130,000
Oil seeds	12,000,000
Sugar, tobacco, cotton, &c.	70,000,000
Sundries	20,000,000
Gross produce of land, *Rupiyas* ...	329,130,000

Now, Mr. Colebrooke, as we know, was a very exact enquirer and the result of his enquiries and observations was the conviction that the gross produce of the land, at the time of the Settlement, was 33 crores of Rupees. The reader has only to look at the prices in this estimate, to see that the change in the value of money has been so great, that, expressed in the currency of to-day, the 33 crores require to be multiplied 3 or 4 times over, when we reach the remarkable fact that the Secretariat experts have discovered that 70 millions of people are fed to-day off a tillage of 70 million acres, that really produce no more than the 30 millions under cultivation, for the 25 millions of people subsisting in 1793. In neither case is the dairy produce or the export produce comprised, but we are to accept it as a fact, 'an approximation,' as Mr. McDonell calls it, 'to the truth,' that the harvests of these rich and crowded Provinces to-day, are just what they were 90 years ago, when two-thirds of the land were waste, and the Provinces but sparsely populated. Are not these exposures as discreditable as we declare them to be?

But we may throw a little more light upon the subject, if we look at the harvests of another land, the soil and cultivation of which so closely resemble those of Bengal as to be nearly identical. Great pains, then, have been taken in the last seven or eight years, in consequence of the exigencies of Egyptian Finance, to ascertain the gross value of the Nile harvests, for the very purpose of ascertaining the pressure of the rental (or *khiraj*, as it is there rightly called) upon the produce of the land. The entire population of Egypt is but 5½ millions, and the whole cultivated area of the land comprises but five millions of acres, against the 70 millions of people and 70 millions of acres in Bengal. Can the reader then believe it to be possible, that while the Government of Bengal is telling the world its belief, that the gross value of the rich and varied harvest of these Provinces is but 103½ millions sterling a year, Egyptian statesmen and European and Anglo-Indian experts, have come to the conclusion that the gross value of the harvest there is 44 millions sterling a year, of which the exports amount to 13 millions sterling? Here are the figures :

Area under tillage.

Ooshr Land	1,329,000 acres.
Khiraj ,, ...	3,514,000 ,,
Abadieh ,, ...	620,000 ,,
Total ...	5,463,000

—against 70,000,000 acres in Bengal. But Egypt grows neither indigo, nor silk, nor opium, nor tobacco, nor tea. Her staples are maize, wheat, pulse, barley, cotton, rice, lentils, sugar (80,000 acres only) flax, and clover, and the value of her harvests is £44,800,000 a year. Her dairy produce and garden produce are not included in this estimate, and the population being small, they are of little account, compared with the same items here.

So large has the strictly urban population of these provinces become in the last ninety years, that the value of the dairy, market garden, fruit, and fodder produce must be enormous. And the local Secretariat positively puts forth an estimate of 103½ millions, as an 'approximation' to the truth, admitting with the next breath that 70 millions have to be added for dairy produce and exports, overlooked (!). Our estimate of the gross harvests at 200 to 250 crores is undoubtedly too low, as we have been seeing for weeks past. And is it no reproach to us, that after 130 years of rule, we are as ignorant of the simplest economic facts of our position, as they were in 1793? We have had a Bill for settling the right pressure of the Rental upon the Land under discussion for 5½ years, and it is only the journalist that can make a reasonable estimate of the position. Common sense should have told the Government that the very first step to be taken, in attempting to regulate the rental, was to institute an exact enquiry, as was done in Ireland, into the pressure of the existing rents and assessments on the yield of the land. To go on with the Bill, as the Government is now doing, without the slightest knowledge of what the land produces, and making ludicrous guesses at it that require to be adjusted by items of 30 millions at a stroke, is really monstrous. It is clear enough from the whole tenor of the Bill, that the men who framed it, believed the Zemindar to be exacting half the produce or more, and so they enacted that he should be restricted to a third or a fourth. It never occurred to them that as they knew the rental to aggregate 13 crores, the gross harvests could only be 26, if the rent were half the produce! Exact enqury, we are convinced, would shew that the rents are not 1-20th of the produce, when the aspect of at least one-half the Bill can provoke nothing but laughter.

Miscellaneous Items.

A German squatter in Victoria has successfully made ensilage for the last three years in a slab hut, instead of a pit.

The latest district reports represent that the crops are flourishing, and prospects excellent, in the Upper Provinces.

We hear that the ceremony of commencing the new Baroda Water-Works was performed by the Maharaja, on the 8th of January.

It is believed that the scheme for the improvement of the Bhanghur Canal and Tolly's Nullah will shortly obtain the sanction of the Supreme Government.

We are glad to hear that the *rubbee* crops in South Behar have been splendid this year. Relief measures will not, therefore, it is hoped, be necessary later on.

The new appointment of Commissioner, or Director of Settlements, in the Punjab, will most likely be filled eventually by Mr. Denzil Ibbettson, C. S., at present officiating as Director of Public Instruction.

THE merchants and traders of Kurrachee have forwarded to the Municipality a memorial showing their grievances, on account of the levy of a duty on imported piece-goods.

ACCORDING to the report of Mr. Pogson, the Government Astronomer, the total quantity of rain collected at Madras during last year, was 79 inches, the average due for the same period being 49 inches.

A SINGULAR fatality is recorded in last week's Bombay season reports. Seven shepherds are stated to have lost their lives at Athni, in the Belgaum district, by being struck by "hailstones of the size of a cocoanut."

IN accordance with the orders of the Secretary of State, service for leave and pension, in the case of Forest State Officers appointed in England, will in future be held to commence from the date on which their pay begins to accrue, *i. e.*, from the date of their arrival in India.

THE sum raised by the Municipality of Bhagulpore, for the construction of the new water-works, not being likely to prove sufficient, the Bengal Government has ordered that the work shall be constructed by the Public Works Department, as an ordinary provincial work, the Municipality only contributing to the extent of the money raised.

THE Guzerat Agricultural Exhibition, including perhaps a horse show, will be held this time at Neriad, on the 2nd March next. It is to be under the joint patronage of his Excellency the Governor of Bombay, and of his Highness the Gackwar of Baroda, each of whom has subscribed a thousand rupees. His Excellency the Governor will, if possible, be present to open the show.

SIR W. H. F. MITCHELL, President of the Victoria Legislative Council, died on the 24th Novr., after a very brief illness, caused by eating poisonous fish. He had been in his usual place in Parliament on the previous Thursday, and seemed then as vigorous, physically and mentally, and as cheerful, as he has been for some years. He was one of the earliest Victorian colonists.

DR. WILLIAM KING, of the Geological Survey of India, in an article on Artesian wells in the *Madras Mail*, lately says that Madras has a fair stretch of alluvium and water sheets in it, and recommends that experiments similar to those at Pondicherry, where they have been successful, may be tried here either by private enterprise, the Municipality, or Government, since the subject of the Madras water-supply has brought up the question of Artesian wells.

BY a notification in the N.-W. P. *Government Gazette*, the Pilibhit and Kumaon Forests are closed against hunting, shooting, and fishing from the 1st of January, 1885, to the 30th June following. It is also notified that entrance to these closed forests is prohibited to the public, except along the regular forest roads, during the above mentioned period. Further, the forests are closed against grazing from date of the notification till further notice.

THE Collector of Customs, Bengal, gives his opinion, in his annual report, as to why the Australian wines, samples of which were shown at the late International Exhibition, are not like to become popular in India, unless their character is considerably modified. In Mr. Armstrong's judgment these wines are too strong and too sweet; they do not stand the climate; and their names, borrowed from those of well-known European wines, suggest expectations which their quality fails to satisfy.

ACCORDING to the latest China papers, in the Hong Kong opium market, a good demand has prevailed for both kinds of Bengal drug, during the past fortnight, and prices have advanced; Malwa has been in moderate request at steady rates; the inquiry for Persian has continued, and values have been further enhanced. At Shanghai a considerable business has been passing in Patna, and the quotations for that drug and Benares have improved. The market for Malwa has remained quiet, at unchanged prices.

WE hear that a good deal of sensation has been produced in the city of Lahore, by the fact becoming generally known, that the *halwais* use "refined" sugar in preparing sweetmeats. A meeting of the Hindu Subha was held on the 30th ultimo, at the Sikha Subha hall under the presidency of Raja Hurbans Singh, and an unanimous protest was entered into against the practice. A committee was appointed to carry out the views of the meeting; and we hear that in the city, the *halwais* have been throwing into the streets the condiments prepared by them, and allowing no one even to touch the same.

SOME of the villagers of Kudicadoo cut the Vernaum tank bund, on the night of the 7th ultimo, and only the fortuitous circumstance that they left the breach with vertical sides, and the sides falling in nearly filled up the gap, averted a serious disaster. The tank is the largest in the Madras Presidency, and if the breach had proved effective as intended, the damage caused must have been enormous. The water would have submerged the whole taluk, and washed the village of Chidambaram away. The partial breach was discovered early the next morning, and promtly repaired, and energetic measures are being adopted to trace the offenders, and bring them to justice.

A FEW days ago a Malay at Pangoran, while walking along a narrow path through a swamp, came in contact with a python, which, after biting his leg, coiled itself round it; he had however, presence of mind enough to seize the reptile by the head, and by forcing its jaws open until they were dislocated, he disabled him. On arriving at the village the alarm was given, and the people turning out, found the snake, which had crept into the scrub, and despatched it. It was 18 feet in length, so the man must have had a very narrow escape.

DEFINITE orders have been issued by the Madras Government regarding the destruction of elephants, under which, permission for shooting will only be granted in the case of rogue elephants, and in those cases in which the numbers of wild elephants may be found to be getting so numerous, as to be a cause of annoyance or terror to ryots and others. Applications of any other nature will meet with absolute refusal on the part of Government. Orders to this effect have been issued to all the Collectors, and the following paragraph has been added to the Standing Orders of the Board of Revenue:—"Permission to shoot elephants, not being rogues, will invariably be refused, unless when it is reported that they are dangerously numerous."

THE largest percentage of paper fibre from the different kinds of woods is that yielded by the mile-tree, or tillia Europea, *viz.*, 38·16 per cent. The next largest per cent is derived from the black alder, 37·82, and these are followed, in course, by the willow 37·81; the horse chestnut, Italian poplar, Canadian poplar, white poplar, fir, aspen, bamboo, white pine, alder, acacia, birch, red pine, ash, elm, pitch pine, osier, oak, filbert, heath, walnut, &c. Among the herbaceous plants, fromenteau takes the lead, furnishing 46·17 per cent, and to this succeeds bent grass, 45·82; canary grass, 44·16; rye, 44·12; wheat, 43·14; marsh rush, 41·70; reed, 41·57; maize, 40·24; blue flag, 40·07; marsh grass, 38·80; barley, 36·21; oats, 35·08; sedge, 33·86; New Zealand flax, 32·71; asparagus stalks, 32·56; wild broom, 32·43. Most of these substances have at various times been employed in pulp-making.

Selections.

RESOLUTION ON THE REPORT OF THE COMMITTEE APPOINTED TO CONDUCT A TRIAL OF THE MACHINES AND PROCESSES FOR THE EXTRACTION OF FIBRES.

REVENUE DEPARTMENT—MISCELLANEOUS.

Calcutta, the 30th December, 1884.

RESOLUTION.

READ—

The Report of the Committee appointed by the Government of Bengal to conduct a trial of machines and processes for the extraction of Indian fibres.

By a Resolution dated the 5th September 1884, the Lieutenant-Governor was pleased to appoint Mr J. W. Hanlon, Superintendent of Jail Manufactures, and Mr. Liotard, of the Revenue and Agricultural Department of the Government of India, to conduct such a competitive trial of machines and processes, for the extraction of Indian fibres, as might lead to the introduction into this country of a cheap, simple, and portable fibre-extracting machine. It was also stated in the Resolution, which was published in the *Calcutta Gazette*, that if the number of machines entered were sufficient to produce a satisfactory competition, the Government would be prepared to award a sum of Rs. 2,000 in prizes. The Report of the Committee, which has now been received, forms a valuable contribution to a subject of great commercial interest, and the thanks of the Government of Bengal are due to Messrs. Hanlon and Liotard, for the care with which they have conducted the trials, and to the Agri-Horticultural Society of India for the assistance they have given, by supplying the fibres used in the experiments. The Lieutenant-Governor accepts the finding of the Committee, that the Universal Fibre cleaning Machine invented by Mr. H. C. Smith, manufactured and improved by Messrs. Death and Ellwood, of Leicester, and brought forward by the General Fibre Company of London, is the best of the nine machines entered for competition. The mechanical working of this machine appears to have been rapid and effectual; and the further question, whether it can be profitably introduced into Bengal, may well be left to be decided by the commercial public, who have already shown considerable interest in the trials. The value of the fibres extracted, and the uses to which they can be put, are also matters to be dealt with by experts and commercial men in the course of their ordinary business, and no further action on the part of Government appears to be called for. Should it, however, be afterwards found that the facts ascertained in the recent trials are not complete enough, to enable the mercantile public to form a fair judgment of the commercial prospects of the successful machine, further trials may be conducted under the superintendence of the Agricultural Department. In the meantime, in accordance with the recommendation of the Committee, the Lieutenant-Governor has much pleasure in awarding a prize of Rs. 2,000 to the General Fibre Company of London, for Messrs. Death and Ellwood's machine. This resolution and the Report of the Committee will be published in the *Calcutta Gazette.*

By order of the Lieutenant-Governor of Bengal,

A. P. MacDonnell,
Secretary to the Government of Bengal.

WATTLE CULTIVATION AS AN INDUSTRY.

A writer, subscribing himself Acacia, sends the following notes on wattle cultivation to the *South Australian Register* :—

It is no exaggeration to say that the various kinds of acacia usually spoken of under the general term of wattles, form one of the most valuable of the natural products of Australian soil. The bark of these trees has for years occupied an important position in the tanning industry, and it may safely be said that the estimation in which it is held is on the increase rather than declining. Side by side with this fact is the important and somewhat distressing circumstance, that the yield of bark appears not only to be on the decrease in quantity but also in quality. The reason of this falling-off is not far to seek. In the early days of wattle-stripping the procuration of sufficient bark to meet all requirements was accomplished with comparative ease, inasmuch as wattles were to be found growing here, there, and everywhere. So widespread was the natural *habitat* of the various sorts of acacias in South Australia, that within the settled districts at all events, it is more difficult to define localities where it did not and would not grow, than to name localities where it would and did thrive. A very large proportion of the unalienated lands was more or less covered with wattles, and so great was the area, that strippers could find a great deal more bark than they had time to strip. Gradually, however, as these lands were parted with by the Crown, the natural growth was burnt off to make way for sheep or wheat, until, as is now the case, wattles are considerably reduced numerically, and are only to be found in certain portions of the original area. As a result of this reduction the price of bark went up to a high figure, and the occupation of stripping and selling bark has now become such a profitable one, that strippers pursue their avocation without the smallest discrimination whatever, utterly regardless of the state of the bark when gathered, and quite oblivious to the future supply. Every available wattle-tree within easy distance of a commercial centre is denuded of its bark, and by this wholesale destruction thousands of young trees of perhaps not more than three or four years' growth are cut off before their prime. Such sinful waste cannot be too severely condemned. The bark from these young trees is much inferior in quality to those of mature growth, while the presence of so much juvenile bark in the market, mixed as it usually is with that of better quality, must necessarily tend to lower the value of the whole product in the estimation of the tanning industry. Moreover, it is in the primary stages that the growth of this tree is slowest, and the accumulation of tannin at its minimum. As the tree advances in years the proportional growth per annum gradually but surely increases both in bulk as well as in the production of tannin. Such facts as these should not be lost sight of by all who are fortunate enough to possess natural wattle plantations, and should deter them from permitting any premature stripping on their estates. The time has now arrived when the systematic preservation and cultivation of wattles, as an industry, will be attended with most profitable results—results which I firmly believe will place wattle-growing in the front rank of colonial industries from a lucrative point of view.

Of the acacias which produce the wattle, or mimosa bark of commerce, there are two species which stand pre-eminent in this colony. These are *Acacia Pycnantha* and *Acacia decurrens*. The *habitat* of the former ranges chiefly from the Adelaide hills north, as far as Beltana. North of Spalding, however, this species assumes a somewhat stunted form compared with what we are accustomed to see in the Adelaide hills. The leaves of this variety are also narrower or more lanceolate than those of the typical form, and the whole tree is easily recognisable from its stem and branches being usually covered with a hoary or glaucous substance. North of the position indicated, the tree is generally confined to the more elevated and hilly portions of the Colony. The typical form is to be found all along the Mount Lofty chain of hills, and the plains from Encounter Bay to north, beyond Barossa; while specimens are to be met with on Kangaroo Island. The other species named, commonly known as the black wattle, is chiefly confined to the south-eastern portions of the Colony. The broad leaved wattle seldom attains a height of more than 25 feet, with a diameter of 8 inches, although in Brown's Forest "Flora" it is stated that a tree was felled at the Semaphore lately, 35 feet in height and 18 inches in diameter. *Acacia decurrens* grows to a large tree in the south-east, and may there often be met with over 40 feet in height and 2 feet in diameter. The average yield of bark of the broad-leaf may be put down at about 70 lbs. for full, well-grown trees, 7 to 8 years of age; while it is not an uncommon thing to get 500 lbs. from the black wattle of a similar age. Although the *Pycnantha* is a smaller tree than the other, and is generally less rapid in growth, its bulk is of greater commercial value, owing to its yielding a larger percentage of tannic acid than the black. The *Pycnantha* on an average yields about 35 per cent of tannic acid, sometimes as much as 40 per cent, while the *Acacia decurrens* rarely gives more than 25 per cent. The logical inference therefore points towards *Acacia decurrens* as the most profitable for cultivation, as in spite of the lower yield of tannic acid per ton this disadvantage is fully met by the increased yield per acre. Both trees grow readily in almost any soil, although they seem to have a preference for those of a sandy nature on the surface, supported by a good, yellow-clay sub-soil. When grown upon pure sand, the bark is somewhat deficient in tannic acid, being at the same time of a thin nature and too full of sap to pay well for stripping. It is worthy of note that bark stripped from trees which have been grown upon poor stony ground produces the greatest percentage of tannic acid. This is a fact of great importance, as there is an immense area of country in this colony of this nature, that has hitherto been classified as unproductive land, but which might with great profit be utilized in the production of these trees.

Both species attain their prime condition between the ages of six and ten years, according to locality and quality of soil. When they are grown on the sandy soil, *i.e.*, with clay bottom, they come in for stripping about the sixth year, while on the stony ground it may safely be asserted that the trees would not mature and pay—"pay" meaning the fullest return obtainable from the tree—to strip before the eighth year. Attention may have been called to the immense amount of pig-face country along our southern coast-line on the one hand, and the numbers of rocky patches scattered over the inland country, both of which are suitable for profitable wattle-growing. Touching the methods of cultivation, sandy soil being of a loose nature, the crop should be put in with the plough, by ploughing strips 18 inches board and 4 feet apart, to a depth of about 4 inches. The seed should then be dropped in about 3 feet apart along the rows. For the first two years after the crop has been sown the ground betwixt the rows should be regularly ploughed or scarified, for the more the land is stirred the more moisture will find its way to the roots, ensuring quicker growth, while ploughing will at all times prove a very valuable ally against fire. The latter item is worthy of note, for I believe I am correct in saying that the various insurance offices do not accept wattle risks, although far safer than the wheat crops so readily accepted. By adopting this method of cultivation, it is calculated that at least two years will be saved in the maturing of the plants than if left to Dame Nature. About the second year pruning must be taken in hand. The rows should be taken in hand systematically, and all large lateral branches which may appear to be interfering with the upward growth of the plant should come off. This operation should be repeated during the third year, after which the trees, partly from the effect of this operation and partly by their proximity to one another, will attain that straight upward tendency of growth which must necessarily be regarded as one of the principal features of a successful wattle plantation, because it is only from straight trees that the bark can be removed with facility, and as a natural consequence the price payable for stripping reduced to its lowest ebb. It may be here noted that the bark which produces the greatest percentage of tannic acid is that which grows on the stem of the tree, and therefore the system of cultivation should be directed to produce as large a bulk of stem as possible, with the least amount of lateral growth in the shape of branches, as is consistent with the proper health of the trees. This can only be obtained by thick planting in the first instance, and early pruning as above indicated in the second place. From careful experiments made, it has been ascertained beyond doubt, that at least 25 per cent more of tannic acid can be procured from a well-pruned tree, than from one left to its own devices, involving that branchy growth which is one of the principal characteristics of the tree.

In the method of planting indicated above, planting at a distance of 4 feet apart has been advocated; but I must here state that many authorities, among whom I may mention the Conservator of Forests, advocate planting at a distance of 8 feet apart in the first instance, and filling up between these rows at the end of the third year. Of course, as wattle cultivation is a thing of the future, experience only can decide on what is at present an open question.

On rocky soil, of course, the same method of cultivation cannot be followed that is feasible on that of a sandy nature, and it is necessary to substitute the spade for the plough. This is, of course, assuming the soil to be of a hard nature. If, however, the soil is of a loose nature it will be found sufficient to sow the seed broadcast after a heavy fall of rain, and the success will be all the more assured if a flock of sheep be run over the area four or five times. This plan has been successfully carried out by the Forest Department in the South-East, at Mount Burr. The next item of importance is the preparation of seed. When this is intended to be covered, either in ploughed ground or by the spade, the plan of scalding the seed has been found to answer the purpose admirably. The simplest way of scalding the seed is to pour almost boiling water upon it. The seed should then be left to soak for about forty-eight hours, and afterwards sweated in a damp bag until quite soft. For broad-cast sowing on the surface, however, this does not give good results, because the seed being half-germinated a change of the weather to dryness is sure to result in a stoppage in germination, and consequently, from want of moisture, causes the young shoots to "damp-off," and the seed decays. In order to obviate this, and prepare the seed all ready for germination in such a manner that it will be independent of any sort of weather, the plan has been adopted of cracking the outer hard covering of the seed by means of slow-firing without partial germination so that the seed can be sown upon the ground, and lie there without injury until sufficient rain falls to make it germinate. In this manner the seed can be sown two or three months before winter, and thus will be in readiness to benefit by the first rains of the season, and consequently the young plants will, before the rainy season is over, have attained such a hold upon the ground that their safety is secured during the following dry season. An explanation of the system adopted will be *apropos* A high heap of wood is formed and fired ; when this has smouldered down to a common expiring condition of red coals and ashes, the seed is thrown into the heap, and the whole stirred up and allowed to remain until the fire goes out. The embers are then raked in a heap, and the ashes and seed bagged together ready for sowing broadcast. There is no doubt that this system is only following out what we see in nature, as all colonists have no doubt noticed that when branches or *debris* of a wattle-tree have been burned, numerous young trees spring up as a matter of course. Following out this system, it is only necessary when indigenous wattle plantations are conserved to burn up the branches of the trees which have been stripped in order to secure a luxuriant young crop. This method has been successfully carried out at the Mount Brown Forest Reserve.

From recent analyses it appears that although the bark upon the trunk of the tree produces the largest percentage of tannic acid, that upon the branches and twigs, as well as the leaves themselves, and to a certain extent the wood of the tree, contain a fair percentage of tannin. In some cases a greater percentage of tannic acid was obtained from the twigs and branches, than is procurable from best English oak bark (which, by the way, is very difficult to strip) This fact opens a question. Cannot we utilize the tannic acid which, under the present system, is allowed to go to waste on the ground ? It is well known to all colonists that hitherto strippers of this bark seldom or never attempt to remove it from the branches, and it has been calculated that in consequence of this, of every one which has been or is being stripped at least one-third of its tannic acid has been allowed to go to waste. Looking at this fact then, and also bearing in mind that however well the trees may be cultivated and pruned under the system recommended, there must always be a considerable quantity of branches and leaves it is thought that when the wattle is cultivated as a commercial crop some means should be adopted whereby the tannic acid in this *debris* could be utilized, and the idea has been broached that this might be effected by a boiling-down system. Huge tanks could be constructed, into which every portion of the tree could be placed after being chopped up, and the tannic acid extracted. The plan seems feasible enough, and if it can be profitably carried out, as suggested, possibly it could be improved on so as to place the tree in whole without any chopping whatever. Enormous saving from its adoption must necessarily ensue ; less cost than stripping, in the first place ; considerable economy in carting to market ; less bulk for export ; no loss from pruning. In addition to these advantages the pap would eventually come in either for paper-making or manure. As, however, this plan has not yet been adopted, I cannot submit figures in a balance-sheet Before submitting an estimate on the probable results of wattle cultivation as an industry, I would like to refer to two pamphlets on the subject already in print. One of these is termed "Wattle Bark," and is substantially a report of the Board of Enquiry appointed in Victoria ; the other is termed "Wattle Farming." and is written by Dr. Schomburgk, and published by the Chamber of Manufactures. The former is devoted almost entirely to the rise and progress of the wattle-bark trade of Victoria, and the evidence of some two hundred witnesses who were examined. Into this I will not dip, but an appendix to the work gives a statement showing the profit to be derived from the systematic cultivation of wattles compiled as a result of the enquiries instituted, which deserves attention. I do not for a moment wish to damp the enthusiasm of advocates of wattle cultivation, but I would point out :—

1. That if the production of wattle-bark varies between two given numbers per acre, it is safer in estimating to take the lowest and thus be prepared for casualty.

2. That although there is every reason to believe that "cultivated" wattles could be stripped for at least half the amount paid for stripping those which have been left to nature, still there is reason to doubt whether strippers at the present time make really good wages at the work, and the reduction that would ensue is, therefore, problematical.

The Wattle Commission and Dr. Schomburgk show a profit of over £2,000 per 100 acres in a run of eight years, and arrive at this highly desirable conclusion by estimating a return of 1,213 tons of bark from those 100 acres. On the other hand stripping is estimated at 15s. per ton as against 30s. now actually paid in this Colony, while cartage is put down at 10s per ton, which, at the present price of wages, I consider, with all due deference, to be at least 30 per cent below the probable expenditure.

As selectors in this Colony are permitted to take up 1,000 acres, I have chosen that area for calculations, and this, according to the Wattle Commission, would yield over 12,000 tons, whereas I put it down at 5,000 so as to be on the safe side. With regard to pruning, the Commission estimate 10s. per acre as against my 4s., and this is the only item in which my figures come under those of the Commission and Dr. Schomburgk. I am of opinion that the item *might* be left out entirely, as the Manager would almost as a matter of course take this into his own hands, and his salary is scheduled Attention is called to the following facts :—

1. The bark from the broad-leaved wattle is the best in the world ; that from the black wattle the second best.

2. The price of bark is rising, and good material is so scarce, that a quantity of inferior bark is used by European tanners out of sheer necessity.

3. Land that will grow wattles successfully is not at present looked upon as worth £4 per acre, the amount set down in the following estimate :—

Estimate of expenditure on a Wattle plantation of 1,000 acres, valued at £4,000, for six years.

	£
Interest on freehold, + compound thereon, ...	2,150
Ploughing and sowing, at 15s. per acre, + interest, .	835
Pruning second and third years, at 4s. per acre, for the two years, + interest	201
Scarifying twice, + interest, say	500
Unforeseen expenses, say	100
Cartage to market and stripping, at £1 and £1 10s. respectively	12,500
Supervision	860
Balance of profit over and above good commercial return for capital throughout	7,764
Total	25,000

Receipts.

Sale of 5,000 tons bark, at £5	25,000

It will be seen that no credit has been taken for the gum procurable from the plantation, nor for seed. Again, the price of bark has been set down at £5, while it is being sold for considerably over £7 at the present time, and in six years' time must fetch more. There were sales in London of chopped bark at £17 per ton recently. Some believers in wattle-growing advocate sheep being run over the plantations after the first two years, but there are two objections to this, *viz.*, if the ground be thoroughly planted there will be very little grass, and that of an inferior character ; and secondly, this plan would interfere with the natural regeneration, involving re-sowing and consequent delay. If the plantation be devoted to wattles, and wattles only, a crop may be relied on every third year after the first six. Yet another point to be remembered. The galls growing on the trees are of considerable value, and could be most profitably utilized on large plantations.

Note.—The above article has been read by me, and I can confidently endorse the general remarks, while I consider that the probable profits shown in the balance-sheet are in no way over-estimated.—J. E. Brown, *Conservator of Forests.*

SILOS IN MYSORE

The following is a report of two experiments made with silos at the Mysore Government Stud Farm, at Kunigal, one being an underground silo, and the other a pile of freshly cut forage under an open sided shed weighted with stones, in the manner described by M. Houles, by whom the method was successfully tried in France :—

The under-ground silo was excavated in dry gravelly soil, with no plastering of any kind, but protected from rain by a light thatched roof supported on forked posts.

The dimensions were—

Length	16 feet.
Breadth	11 "
Depth	10 "

with a gradual slope of 4 inches from top to bottom, the cubic capacity being 1,715 cubic feet.

Work was commenced with the silo early on the morning of 28th December 1883, when the grass in paddock No. 1 was mown with scythes, and as it was cut, carted off and deposited in the silo. Before packing the green grass, a layer of paddy straw was placed at the bottom of the silo to keep out the damp, and the grass was then laid on it, to a depth of three feet, great care being taken to have the four sides well trampled down by women. As it was determined to try the effect on different descriptions of forage, the following layers were successively packed and trodden down :—Hurriali grass at the bottom, followed by intermediate layers of chaffed oats, sorghum, hurriali grass, chaffed sorghum, and hurriali with a final layer of chaffed sorghum. On this was spread a layer of paddy straw 3 feet thick, and a platform made of the branches of the hougay tree was laid on the top and weighted with large rough rubble stones. The work was finished on the 24th January, three days being occupied in weighting, &c. The silo was opened on the morning of the 16th August, seven months having elapsed since it was closed, and the mass having sunk 4 feet in the interval. I had no apparatus for forcing down a thermometer to a greater depth than 3 feet below the surface, but the temperature at that depth was 96 degrees, or 14 degrees higher than that of the air, which was 82 degrees, under cover of the shed. When opened, the top layer of sorghum was a dark brown colour, warm and damp to the touch, and containing so much moisture, that on pressure a reddish juice exuded at once. The hurriali grass was not so moist, but was appreciably damp and looked like inferior hay. The vinous smell from both was most overpowering, and at the edges of the silo the forage was of a different colour, and emitted a very offensive smell.

A cubic foot of the ensilage was cut out at 1 P.M., when it weighed 21lbs., and on being weighed again three hours afterwards, it had lost 3lbs. by evaporation under a strong wind.

In the course of the afternoon, 56 cubic feet were cut out evenly from top to bottom at one of the corners, the contents being so consolidated that it required two men using a sharp spade-shaped steel knife to do it.

The mass weighed 1,099lbs., or 22lbs. per cubic foot, and the stones on being weighed were found to be 31,360lbs. in weight, giving a pressure of 178 lbs. per square foot.

Some of this forage was at once given to the farm cattle, which ate it with avidity, and it was with one or two exceptions readily eaten by all the horses to which it was offered. On the following day the vinous smell had passed off, and was succeeded by an offensive odour, which gradually subsided when the forage was loosely spread out, and when I left Kunigal, it was being consumed by the farm cattle.

A cubic foot of the hurriali grass was brought into Bangalore, and is now quite dry and much like inferior hay, except that it retains a rather peculiar smell.

Cattle and horses eat it at once when given to them.

The pile of forage treated on Monsieur Houles's system, consisted of green lucerne and guinea grass, cut on the morning of 27th January 1884. On that date, a quantity of this was cut and packed under an open thatched shed of the same kind; on the 28th, more was added, and on the evening of that day, the pile was covered in and weighted with stones.

The dimensions before weighting were:—

				ft.	in.
Height	...	...	...	... 5	3
Length	...	...	...	... 7	0
Breadth	...	...	...	... 7	6

but in the course of a month, the mass had sunk to within half a foot from the ground.

On being opened, it was found that, the top and sides were entirely decomposed and smelt abominably, but by gradually cutting away the outside portion, it was ascerained that a portion in the centre was very well preserved. The lucerne was of a dark brownish green, moist and warm, without much smell, and readily eaten by the cattle.

On the 16th August, a cubic foot of this ensilage weighed 42lbs., and on the 18th, 40 lbs., showing a loss of 2 lbs. by evaporation, the pressure having been 105 lbs. per square foot.

A cubic foot was brought into Bangalore, and when examined a week after, the centre of the block was still slightly heated, the thermometer showing 83 degrees, against 79 degrees, the temperature of the room at the time.

These experiments are useful, but in the case of the underground silo, the work was not carried out exactly in accordance with my instructions, and the result did not appear at the time as satisfactory as was expected.

This silo took a much longer time to fill than was anticipated, and the stones used for weighting were, through a misapprehension of the orders, not covered with earth; the weight both on this silo and on the other was unequally distributed, so that a uniform pressure was not imposed on the whole mass.

The filling of the undergound silo was in fact accidentally carried out somewhat in the manner described in a paper in the 'North British Agriculturist,' by Mr. G. Fry, F.L.S., Chobban, headed "The Production of Sweet Ensilage," in which case the product is said to possess all the characteristics of hay, except that it is moist instead of dry.

The cavity from which a portion was taken out was filled with earth at once and closed, as it was considered best to reserve the remaining portion for a further trial.

I returned to Kunigal on the 8th instant, accompanied by Colonel Magrath, the Commissary-General, who was anxious to see the silo, which was re-opened on the morning of the 9th in our presence, and a large portion cut out for examination.

It was most satisfactory to find all offensive odour had disappeared. The vinous smell was not nearly as strong.

A half-inch gas pipe was driven down to the centre of the mass, and the temperature as shown by a thermometer lower down the pipe, was apparently 29 degrees Centigrade, equal to 84·5 Fahrenheit It however rose in 10 minutes to 32 degrees Centigrade equal to 89·5 Fahrenheit, and the actual temperature of the fodder when the thermometer was brought into direct contact with it in the centre of the block, was 40 degrees Centigrade, equal to 104 degrees Fahrenheit.

Two cubic feet of the hurriali grass were cut out, and each cubic foot weighed separately with the following results:—

No. 1, at 11-30 A.M.	weighed	...	... 22	lbs.
2-30 P.M.	,,	...	... 18	,,
No. 2, at 11-30 A.M.	,,	...	... 22	,,

Spread out and dried as hay, weighed 13 lbs., having lost 9 lbs. by drying.

The hurriali grass was slightly discoloured with white mould at the edges, and for about 1 or 2 inches of the surface, otherwise it was moist, sound and sweet, and was eaten greedily by cattle, as well as by the horses.

The chaffed sorghum contained more moisture, but was in admirable condition, and was readily eaten by all the animals except one or two. In some cases, they left the green grass which they were eating and took the ensilage in preference.

Colonel Magrath and myself were entirely satisfied with the success of the experiment, which has shown clearly that green forage can be stored and preserved with less difficulty and labor than hay.

The experiment with the surface silo shewed that green lucerne and guinea grass were more easily compressed than hurriali, and from the condition of the lucerne in the centre, I have no doubt that if the forage had been in an underground air-tight silo, the whole would have been in excellent condition.

The pressure in both of these silos does not, however, appear to have been nearly as great as is recommended elsewhere, and it might apparently be increased with advantage to 300 lbs. per square foot, the weight being calculated and arranged previously instead of being, as in this case, put on by guess.

There seems to be no necessity for cutting up grass, lucerne or guinea grass, but the chaffed sorghum was found to be a very convenient form for giving it to the animals as required; quantities were at once lifted out and carried away in baskets.

A point on which also I entertain no doubt, is that in practice, it will be found better to have a number of silos of a comparatively small size than a few large ones. It is impossible to fill, weight, and close a large silo without great delay and interruption, and the carriage of the grass from a distance adds to the trouble and expense.

The trials to be made in the Amrit Mahal Kawals will, therefore, be with silos of the dimensions recommended by Sir Herbert Macpherson, who has very kindly given me much information on the subject, and who has shown by his own experiments, that the most convenient and easily filled silo contains the grass of from 2 to 6 acres, cut from the land immediately surrounding the silo.

A. C. HAY,
Offg. Mily. Secy. to Mysore Govt.

WHEAT PRODUCTION IN CANADA, THE UNITED STATES, AND ENGLAND.

COLONEL M. J. WHEATLEY writes thus in reply to certain criticisms of his article on the above subject which appeared in these columns:—

"I read with much astonishment the letter of Messrs. Howard, in your paper last week, disputing my statement that self-binding reapers are to be obtained in the United States for 160 dollars, and intimating that they are not to be procured there under 300 dollars. Messrs. Howard are themselves the manufacturers of the self-binders that took the second prize at the recent Shrewsbury trials, Messrs. Hornsby having taken the first prize. I have before me the printed circulars of both firms, as also of Walter A. Wood, one of the principal American firms that competed. All these quote £60 as the price; but there is doubtless a discount. They are, I believe, the best and most expensive machines made, and may be well worth the money asked. In America, however, self-binders have been in general use for many years, are as common as lawn-mowers are in England, and though, doubtless, not possessing all the merits claimed by Messrs. Howard for the English machines, are to be obtained at all prices, of various patterns, and from an immense number of manufacturers. In Brandon, 130 miles west of Winnipeg, an important town in the Canadian wheat field, they were being sold at 150 dols., and were offered to me at that price in September. As stated in my previous letter, prices are generally higher in Canada than the States, and in naming 160 dollars as the usual price in the States, I am satisfied I am not under the mark. I saw immense numbers exhibited in the shows at Montreal, Toronto, and Chicago. It would certainly be strange if they were all sold at as high a price as the best made English ones, containing all the most recent improvements. Messrs. Howard also dispute my statement that wheat is practically never tied by hand in America, on the ground that there are a large number of self-delivery reapers in use there. Very likely, but the sequitur is not apparent. There is a large area in that country of "corn" (by which, I presume Messrs. Howard mean wheat barley, and oats, though in America the term is applied exclusively to maize) which is never tied at all, especially barley and oats. I emphatically repeat my statement that you may travel through America in harvest time from North to South, from East to West, and never see a sheaf of wheat tied by hand, though I am not prepared to state that such a thing may not be still done in some places, especially in the more settled districts. The advisability, however, of using self-binders can only be regarded as one among many elements of the agricultural problem of producing wheat cheaply, which is the really important one for our agriculturist

"It cannot be too carefully borne in mind that changes of all kinds occur in America with a rapidity that can scarcely be credited in England. Because a machine of any kind was not used in a district two or even one year ago is no ground for assuming that it is not in pretty general use at the present time. The "cutting" of prices, too, goes on in an astonishing manner, and a price twelve months ago is no guide whatever to present charges in machinery, railway rates, or anything else. Farmers, too, who may even a year ago have fancied themselves growing rich may to-day find themselves growing very poor or being rapidly ruined. The fall in prices, of wheat especially, has made these changes more violent than usual even during the last twelve months. Everybody seems to be selling everything for whatever they can get. My belief is, for the reasons given in my previous letter, that the present price of wheat cannot last, but any argument based on the state of things in the wheatfields of the West, even a year ago, must be modified to meet the present condition of affairs. I am well aware that farming is carried on in America under very different conditions in many ways, especially as regards labour supply, to those prevailing in England; but it is, I believe, to a great extent owing to this scarcity of labour that the Americans have become such an extraordinarily industrious and intelligent nation, always ready to adopt every improvement, and to adapt themselves to every change of the circumstances that surround

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Crop and Weather Report.

[FOR THE WEEK ENDING THE 7TH JANUARY, 1885.]

General Remarks.—During the week under report, rain has fallen in a few districts in the Bombay Presidency, in the Central Provinces, and in the Central India and Rajpootana States. There has been rain in varying quantities also throughout the Punjab, and in many districts of the North-Western Provinces and Oudh.

General prospects are fair in the Madras Presidency except in parts of Bellary and Anantapore. In the Kurnool and Coimbatore districts, more rain would be beneficial to the crops, which are withering. Harvest operations continue. In Mysore and Coorg prospects are generally good. *Rabi* prospects have been much improved in Bombay, and except in one or two districts the condition of the crops is generally good.

In the Berars, the Nizam's territories, and in the Central India and Rajpootana States, agricultural prospects remain unchanged.

The recent rain in the Punjab has much improved the *rabi* and the crops are now in excellent condition. In the North-Western Provinces and Oudh and in the Central Provinces, prospects are favourable.

More rain would be beneficial for the *rabi* in Bengal, which is however doing well; some of the crops are being gathered. The paddy harvest still continues, and the sowing of *Boro* paddy has commenced, and lands are being prepared in a few districts for the *aus* crops.

In Assam agricultural prospects continue favourable. In British Burmah the rice harvest has been almost completed, and threshing has begun, the outturn has been fair.

The public health is generally good. The mortality from cholera in the Chingleput, Coimbatore, Tanjore, Madura, and Malabar districts of Madras continues high.

Prices are falling in Bengal. Elsewhere they are generally stationary.

Madras.—General prospects fair, except in parts of Bellary and Anantapore.

Bombay.—Rain in parts of Sindh and Gujarat; *rabi* prospects greatly improved by the recent rain; standing crops generally in good condition except in parts of four talukas of Belgaum and three of Ahmednugger; scarcity of fodder and drinking water in several talukas of Dharwar and Belgaum; cholera in parts of Thana, Kanara, and Rutnagiri; fever in parts of 14, smallpox in parts of 9, and cattle-disease in parts of 7 districts.

Bengal.—There has been no rain again in any part of the province; *rabi* crops are generally doing well, but a shower of rain will greatly improve the prospects; some of the crops are being gathered; harvesting of paddy still continues; sowing of *boro* paddy has commenced, and lands are being prepared in a few districts for *aus* crops; prices of food grains have been falling; cholera is abating in a few districts, but it is still prevalent in many others, and small-pox is reported from about half-a-dozen districts.

N.-W. Provinces and Oudh.—Weather cloudy, with light rain in most districts; destructive hail in Lucknow; prospects favourable, and prices easy.

Punjab.—Fever decreasing in the Hissar and Umballa districts; health of the rest of the province good; crop prospects good.

Central Provinces.—Weather still cloudy and rainy except in eastern districts; *rabi* prospects continue good; cattle-disease in Rajpore abating; prices steady.

British Burmah.—Cholera is somewhat prevalent in Prome and Thongwa; slight smallpox here and there, otherwise public health generally good; slight cattle-disease in Akyab, Bassein, and Thongwa; elsewhere health of cattle generally good; harvesting almost completed and threshing begun; outturn fair.

Assam.—Weather seasonable; mornings foggy, nights cool; harvesting of *sali* paddy over; sugarcane being cut; mustard doing fairly well; public health good.

Mysore and Coorg.—Crops in good condition in parts of Bangalore districts; *poonji* paddy has failed in Tumkoor district; Bengal gram is affected by worms; prospects fair; public health good, but cholera is prevalent in the Shimoga district.

Berar and Hyderabad.—Weather cool; *jowari* being reaped; prospects of *rabi* good; *tabi* sowings in progress; no sickne

Central India States.—Weather cloudy; prospects of crops and health good.

Rajpootana.—Weather cold and severe; crop prospects favourable; prices steady; health good.

Nepal.—Weather good; prospects fair.

Letters to the Editor.

THE ROYAL AGRICULTURAL COLLEGE AT CIRENCESTER.

TO THE EDITOR.

SIR,—I have just received a copy of the Cirencester local paper, giving the results of the last Diploma examination. You will see that Mr. D. B. Allen, B.C.S., has distinguished himself. As stated by the Principal, it was expected that Mr. Keen and he would tie for the Gold medal, and that in fact the competition would have been much closer if Mr. Allen's studies had not been hindered by domestic bereavement. As it was, the Principal stated that under all the circumstances Mr. Allen's position was one which he hoped would be gratifying to himself, as it certainly was to the staff. He further reminded his hearers that in the last examination for the diploma of the Royal Agricultural Society of England, Mr. Allen had done honour to his college and to himself by occupying the first position of all the candidates.

Mr. Allen will be shortly back in India, and Bengal will have added another M. R. A. C. to its number. The first graduate of the College was Kumar Narayan of Cooch Behar. He was soon followed by Messrs. A. C. Sen, S. S. Hussein, and G. R. Bose, the last named having also secured first honours at the R.A.S.E. examination.

The failure of Mr. Chakravarti, who joined the college with Mr. Bose, will be learnt with much regret, and I can myself certify that that failure was due to ill-health alone. The class lists show a large number of Indian students. Besides the Bengal scholars, the names of Messrs. Hewson and Studman, of the Punjab Civil Service, and those of Messrs. Mehta and Sheshadre from Bombay, frequently occur in conspicuous positions.

E. C. OZANNE, M.R.A.C.,
Director of Agriculture, Bombay.

Editorial Notes.

THE Rhea Cultivation and Land Company, Limited, has been registered, the stated object being to cultivate rhea, coffee, tea, &c., in India and elsewhere. The capital is only £10,000, divided into shares of £1 each. The first subscribers are—Charles Fox, clerk; S. J. Hewlett, clerk; Daniel Von Oegar, merchant; W. P. Daniel; Louis *Francatelli*, clerk; Messrs. Isaacs and R. W. Otto Rochs. The Company is registered without articles of association.

⁂

SOME of the incidents in connection with the late hailstorm at Lucknow are interesting. At the Railway Workshops numerous flocks of pigeons have made the place a favourite haunt, and these were killed in large numbers by the hail, affording a cheap and extra dish of plump birds to many railway employés and their families. They were distributed in basketsful among the occupants of the railway barracks. Great quantities of wild birds on all sides fell victims to the hailstorm. Those Bohemians of the Indian bird-tribes, the *crows*, especially suffered. Clever as they are in holding their own against mankind, all round, they were powerless to avert their fate when taken in flank, and surprised as they were on Saturday morning. Every description of bird, in fact, having its *habitat* hereabouts, was to be found mangled and killed when the storm was over; the falling trees slaughtering them as effectually as the hailstones,—which, driven at hurricane-speed, must have had much the destructive effect of musketry at long range. The town lamps, too, have been extinguished since the storm. Many are of course injured, but others again are intact; nevertheless the lighting committee, or the lighting contractor, or whoever is in charge of this important function, have not been slow to grasp at the opportunity of economising the public kerosine, and so the roads are as dark as ever they were in Lucknow's darkest nights, when the old Municipal rushlights did duty as indicators of the surrounding blackness.

⁂

A Memorial signed by 3,000 ryots of the Chingleput district in the Madras Presidency has been sent to the Government, praying for suspension of the collection of *kists* till February next, and to show them consideration in the remission during the *jummabundy* of this year. They also ask that orders be issued to the Revenue authorities to collect the instalments in future years after the month of January, when they will have harvested their crops, and will have converted their grain into money for the payment of Government dues. Their reasons for asking the concession is, that owing to the absence of rain in the proper season, they did not make good progress in agricultural operations this year. But owing to the fall of heavy rain in the latter part of the past year, they have incurred heavy loss in crops, and had to begin over the agricultural operations in many places. They also complain of the great hardship they experience in being compelled to pay the land *kist* every year from the month of December, even in years of favourable harvest, as they hardly harvest any crop at that time. Such being the case generally, their embarrassments have increased in the present season for reasons stated above. The occupation of the agricultural classes leaves no surplus fund to fall back upon in unfavourable seasons, so as to enable them to meet the Government demands in advance. Their annual receipt is barely sufficient to maintain them and their families throughout the year after paying the land-tax. In addition to these hardships, the land-tax which has hitherto been collected after the 15th of every month is now being rigorously enforced from the 10th, by order of the Revenue authorities. So far, justice seems to be on the side of the ryot; let us wait for the other side of the question—what the Government has to say for itself.

⁂

We have to thank the Indian Tea Association for copy of "Papers regarding the Sau Tree, and its remarkable influence on the Tea bush." In a little *brochure* of 16 pages, the subject is exhaustively treated without any attempt at so-called scientific investigations. It is a plain, unvarnished account of the experience of planters who have devoted their attention to this natural phenomenon. The Sau tree grows common in most parts of Assam, especially in land lying rather low. A planter in Upper Assam had some years ago drawn attention to it, and called it a "tea-fertilizing tree;" within the last few years, however, from experiments made, it has been proved that Sau tree possesses peculiar properties in considerably improving exhausted soils, thus causing tea bushes to flush vigorously, and imparting a vitality to old tea which it is sadly deficient in. Of course, in the absence of a thorough chemical analysis of the soil, it would be useless to hazard an opinion as to the reason of the Sau tree exercising such an influence, but that it does exist is a fact which may not be doubted since there is a consensus of opinion among the planters who have taken the trouble to watch the course of events. It is not on account of the shade it offers to the bushes, that the increase in yield can be explained away, because, as Mr. Buckingham says, "the generality of planters condemn shade. It tends to make the bush throw out long stalky shoots, racing with each other to reach the light, and the flushes from such trees are necessarily meagre and woody." But it is otherwise with the 'Sau.' The tea plants under this tree are broad in proportion to their height, have an even growth over the whole surface, and are equal to the very best tea found anywhere. But this is not all; the tea under the 'Sau' enjoys immunity from blight when the surrounding trees are suffering. An area of three acres planted with 'Sau' about ten years ago has yielded for the last four years more than double as much tea as any other part of the garden. One planter accounts for the results thus:—"It is possible that Acacia trees take up nourishment from the soil not required by the tea plant, give sufficient, not too much shade, keep down jungle, and, sending their roots down much lower than the tea plant, drain the subsoil, and enable the latter to send roots down lower than it otherwise could."

⁂

Certain South African economists are calling upon the farmers of the Cape Colony to make their own jam. It is pointed out, and not unreasonably, that the tradesmen of the Colony make a feature of their array of imported jams, but do not attempt to sell the home-made article; and the complaint is not unnaturally made that there is something wrong in the apathy of the people who in a country so well-favoured in the matter of fruit-production—where, indeed, the proposal has often been mooted that the surplus supplies of fruit should be exported, either fresh or dried, to Europe—actually import jams when they might make them better and cheaper themselves. No doubt, many households, as in England, make their own stock of "home-made" jams, instead of buying at all; but those who do buy have to put up with the imported article, simply, no doubt, because it has not occurred to any one to start *à la* Crosse & Blackwell. We have often urged agriculturists in the Colonies to "despise not the day of small things," and we are glad to see the warning re-echoed in the colonial press.

⁂

Another colonial product, the extended cultivation of which is being advocated in Cape Colony, is coffee. The *East London Advertiser* recently recorded the gathering of a crop of 2,000 lbs. of coffee from an experimental plantation near the Chalumna. This is by no means the first time that coffee has been grown in Cape Colony, but it is the first time, we believe, that so considerable a crop has been gathered on a single farm. It would make an interesting exhibit at the Colonial Exhibition in London in 1886—unless, indeed, by that time a better sample is forthcoming. Silk culture, again, is being urged on the attention of farmers in Cape Colony, just as in New Zealand. It is in new enterprises of this sort that the spirit of the Colony is ready to display itself, if only a period of rest from its internal troubles is guaranteed by a patriotic Government. Considerable attention, again, is being given to cotton planting, and seeds of different varieties are being distributed among the farmers of the Colony,—and even so far north as the Free States and Transvaal—by W. Cawood, of Grahamstown, for experimental purposes. Every effort to multiply the agricultural resources of our Colonies merits the warmest support.

⁂

Mr. Luttman-Johnson, Deputy Commissioner of Sylhet, has been enquiring into the subject of the prices of agricultural labour in his district. His calculation is based upon wages in kind paid to a reaper at harvest time. In twenty days' working at harvest time, a man might earn about six maunds of rice, enough to support him throughout the year. Reduced into money, the wages amount to five annas a day. In the report for 1882, similar results were shown in his account of wages paid in Sylhet for earth-cutting. Mr. Johnson says that natives of Sylhet will not work in tea gardens for two annas, the ordinary rate paid to tea coolies: but they have earned so much as five annas a day during the year under report. This is about as good a return for agricultural labour as may be found in any part of India.

⁂

The agricultural and commercial depression now prevailing in England—on which Mr. S. Williamson, M. P., contributes a very able paper to the January number of the *Fortnightly Review*—may be said to have resolved itself into a fight of Charity against Starvation. Never was misery more severe, or helplessness more complete; never was the hand of the bountiful more liberal, or the organization for the relief of suffering more conscientiously developed. If the existing distress is not as widespread as that created by the cotton famine twenty years ago, it is in many quarters as deep. In every town, from the East-end of London, throughout the Midlands, to far North of the Tweed, thousands and thousands of families are huddled in furnitureless rooms, hungry, cold, hopeless. On the Clyde, on Tyneside, at Jarrow, at Gateshead, at Aberdeen, at Glasgow, at Sunderland, at a hundred other centres of industry, men with large families to support have been unable to get work now for nearly twelve months, and it says much for the thrift of the working classes that many have until quite recently staved off the hour, when an appeal to charity became inevitable, solely by their hard-earned savings. What the condition of the country would be at this moment, but for its Charitable Organisations, it is impossible to conceive. At places like Jarrow thousands of children are fed and families relieved out of the funds of the Local Committee; in Newcastle a thousand pounds a month goes in relief; in Sunderland over seven thousand pounds has been raised for similar purposes. And these are only a few instances of the noble efforts which charity is making to withstand the starvation of the masses.

⁂

The Collector of Bellary lately reported that the circumstances of the district render it improbable that an Agricultural Exhibition held at Gooty during the present season could result in anything but failure. Farmers are thoroughly discouraged by the drought of the present year, which in Gooty, Alur, and and Bellary taluks, is certainly the severest of which there is any record, or tradition. With much regret, therefore, he recommended that the idea of holding the show next month be given up. The Government has therefore postponed the show for one year.

⁂

The report on the prospects of the wheat crop in the North-Western Provinces and Oudh, for the month of December, is as follows:—"The estimated area under pure wheat in the North-Western Provinces and Oudh, according to the returns of December, is 5,532,200 acres against 5,523,500 acres estimated in November. The increase of 8,700 acres is due to the sowings not having been quite finished when the November forecast was issued. Slight and partial showers of rain fell in the northern and western districts late in December, but not sufficient for the young crop. Little or no rain fell in the southern and eastern districts. Owing to the almost complete failure of the December rains, the hopes expressed in the November forecast of a bumper crop cannot be realised. But if moderate rain falls in January, the crop will still be above average. If no rain falls in January, a serious deficiency may be anticipated."

⁂

The last Administration Report of British Burmah tells us that nearly ninety per cent (88) of the cultivated area in the province, is under paddy, the cultivation increasing steadily by more than 100,000 acres a year. Out of the 4,000,000 acres under tillage, 232,428 acres are fruit and vegetable gardens. "This kind of agriculture pays well, and that a ready market exists for all orchard and garden produce goes to support the view that the people of British Burmah are well off, and live comfortably." We have frequently pointed out that the calculations of our settlement officers are constantly vitiated, by their uniform failure to take any account of the garden, fruit, and dairy produce of the ryot's holding. Whenever these holdings are in the neighbourhood of the cities which are growing up all over India, these items form a most valuable part of the produce, as we here read they do in Burmah The report tells us that in most parts of the province, the land revenue amounts "to from one-twelfth to one-tenth of the value of the gross produce, and good markets are available directly the rice crop is harvested."

The exports from the province are about £9,000,000 sterling a year, the chief items being—

				£
Rice (paddy) ...	...	...	...	5,500,000
Cutch and Gambia ..	...	...	...	370,000
Hides ...	...	..	...	160,000
Timber ...	...	...		1,600,000
Cotton ...	..	..	...	200,000

The gross land revenue is about £670,000 a year, but the addition thereto of a capitation tax of £300,000 a year, brings the assessments up to nearly £1,000,000 sterling. The general result is that the land bears an assessment of about two rupees and-a-half per acre, the State thus exacting a larger payment from the cultivator, than the so-called rack-rent levied by the zemindar in these provinces under the Permanent Settlement. When we remember the resources of the two provinces, and the fact that more than 88 per cent in Burmah is simply under paddy, we have another forcible illustration of the absurdity of supposing that a rental of less than Rs. 2 per acre in Bengal, with its richly varied produce, can possibly be a rack-rent. We cannot push our inquiries in any direction whatever, without seeing how absolute are the delusions under which the Tenancy Bill has been brought into Council. The Government may persevere with it, if it choses to do so, but it is in the teeth of a general conviction that it ought not to do so.

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It is seldom we get so exact a statistical fact as the official statement that "88·5 per cent of the cultivated area of British Burmah is under paddy, assessed at an average of Re. 1-14-5 per acre." Now this *assessment* is as nearly as possible the precise sum per acre which the Bengal zemindar exacts as *rent* from his tenants in these provinces, and that the framers of the Rent Bill persuaded themselves was a rack-rent. The exact area of land under *paddy* in the Bengal provinces is unknown, but we do know that paddy is the least valuable crop which the ryot grows. With nothing but paddy in Burmah, the State exacts an assessment of precisely the same weight as the rental charged by the zemindar upon the richly productive soil of these provinces. And he is an oppressor! But the State exaction is a good deal heavier in Burmah, for every adult married man in Burmah has to pay a capitation tax of Rs. 5 a year in addition to the assessment, so that if his holding is five acres, he has to pay Re. 1 per acre in addition to the Re. 1-14-5, or nearly Rs. 3 per acre.

In the North-West Provinces, as we have seen, the assessment alone is Rs. 3 per acre, and the rental Rs. 3 more. Is it possible we ask, for proof to be more overwhelming, than the proof these simple facts furnish, of the astonishing ignorance under which the Bill was drafted? And is it creditable we ask, for the Government to persevere with a measure based upon such astounding misconceptions? For the State to exact Rs. 3 per acre from mere paddy cultivation in Burmah, and Rs. 3 per acre from the comparatively sterile soil of the North-West Provinces, is nothing, but for the zemindar to exact less than Rs. 2 per acre from the rich deltaic soil of these provinces, is so oppressive that we must positively cancel the Settlement made with him, on the ground of the extortion he is practising upon his tenants!

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The second report on the prospects of the wheat crop in the Central Provinces is as follows:—"Rain has fallen throughout the Provinces, but has fallen unequally. In the last week of December, there was a fall ranging, roughly speaking, from 2 inches in southern to half inch in northern districts. Since then more rain has fallen in the north of the Provinces, and the wheat prospects of the northern districts may be considered assured; in the Southern districts of Chuttisgurh and the Nagpore country, prospects are excellent, and were it not for the contraction in area, the gross outturn would be above the average."

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The following is Captain Plumer's report on the Mysore Gold Co., dated 13th November:—"In Taylor's shaft, under the 173 on the underlie, we have been taking down broken rock from the hanging side, and putting in timber this week. Width of lode 3 ft.; assay value, 5 ozs. 4 dwts. 8 grs. of gold per ton. In the north drift the lode is smaller (18 in. wide). There is a great deal of water in the No. 1 winze in bottom of the 173 on west lode; the little rib of quartz I reported has cut out. No. 2 winze, in bottom of the 173 on west lode; there is some difficulty in getting men to work these hard places; we hope to do better next week. In the 173 north end on west lode the rock is very tight, a mixture of quartz and trap-rock. The 173 north end back to the point under the proposed new shaft; it will help this work greatly. We are melting gold to-day, but I am not sure that it will be completed in time for me to give you the full information in this letter.

It will far surpass any of our previous returns It has been an exceptional month, as we got to the bottom of the old men's works and had the rich pickings they left behind. Now we have to sink, and in the hard stone progress is slow."

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As the French Government has now made known the amount of duty which it will consent to lay on foreign corn, it is of general interest (says a correspondent of the *Standard*) to establish by a comparison with other countries the position France will be in if the Chambers adopt and ratify the proposals of the Cabinet. These proposals are that a duty of 2fr. 60c. shall be levied on every 100 kilogrammes of corn imported into France, and that the tax on the same quantity of flour shall be 5fr. 20c. There are six European countries, England, Belgium, Denmark, Sweden, the Netherlands, and Russia, in which corn does not pay any import duty at all. In the other European States the import duty on corn and flour expressed in francs and centimes, and per 100 kilogrammes, is—Switzerland, corn 30c., flour 1fr.; Norway, corn 28c., flour 1fr. 71c.; Italy, corn 1fr. 40c., flour 2fr. 77c.; Germany, corn 1fr. 25c., flour 3fr. 75c.; Austria-Hungary, corn 1fr. 25c., flour 3fr. 75c.; Greece, corn 1fr. 41c., flour 3fr. 51c.; Spain, corn 4fr. 20c., flour 6fr.; Portugal, corn 5fr. 60c., flour 8fr. 96c.; Turkey, corn 8fr. 10c., flour 8 per cent. It therefore follows that if, instead of maintaining the existing import duty of 60c. on corn and 1fr. 2c. on flour, the Chambers vote the Government proposals, and raise it to 2fr. 60c. on corn and 5fr. 20c. on flour, bread will not only be dearer in France than in England, Belgium, Denmark, Sweden, the Netherlands, and Russia—where no import duty is levied on corn—but also dearer than in Switzerland, Norway, Italy, Germany, Austria, and Greece, where the duty would be lower. At the present moment, when such undeniable distress prevails among the poorer classes, it is almost impossible to exaggerate the consequences of that increased taxation, for the burden of the tax would fall chiefly on the French workmen, who make bread their chief article of food. It is calculated that the proposed augmentation on the duties on corn and flour would entail the additional expenditure of 60fr. per annum for a workman's family composed of four persons. Of course the partisans of this protectionist measure pretend that the working classes would be compensated for the extra expenditure by higher wages, but all the evidence that has been collected by the Parliamentary Committee instituted to inquire into the present economic crisis, goes to prove one of its chief causes to be the price of labour in France, which is already so high that French manufacturers cannot compete with their foreign rivals.

⁂

The report on the prospects of the wheat crop in the Berars for the month of December is as follows :—" Acreage under wheat 845,136 ; 5 per cent above the average, which is 803,055 acres for the province. Crops in good condition, but fears are entertained of possible damage from excessive cold after unusually heavy rain."

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The *Mining Journal* of the 13th ultimo wrote: " Mr. Justice Chitty has directed a meeting of the creditors of the Mysore Reefs Gold Mining Company to be summoned for Friday next, to ascertain their wishes as to the proposed sale of the mining property, plant, and machinery of the Company, upon the terms set forth in an agreement dated December 5, and made between the Company of the first part, Thomas Stephen Evans of the second part, and J. Harvey, C. J. Harvey, L. H. Evans, C. S. Blair, and J. Cockburn of the third part, as trustees for a new Company intended to be formed and registered as the New Mysore Reefs Gold Mining Company (Limited). The said judge has appointed the said Thomas Stephen Evans, the official liquidator of the said Company, to act as Chairman of such meeting. The terms of the intended sale, are—1. The payment of £5,500 by instalments extending over nine months.—2. The intended Company undertaking, in the first instance, to offer its shares to all the Mysore Reefs shareholders, *pro rata*, according to their respective holdings. Such shares are to be applied for (if the present Mysore Reefs shareholders desire to have them at the price) within a period to be fixed by the Directors of the new Company, and to have the sum of 15*s*. per share credited as paid thereon, and the balance of 5*s*. payable upon such shares to be paid by instalments, and they are also to be offered by the Directors of the said new Company one fully paid £1 share in the new Company as a bonus upon every five shares that shall be subscribed for such bonus share, to be allotted when the other shares shall be fully paid up, the new Company to take all necessary steps to register an agreement for the issue of such share with the Registrar of Joint-Stock Companies."

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The first report on the prospects of the wheat crop in the Punjab is as follows :—" Average acreage 6·75 millions, estimated actual 7·25 millions ; estimated outturn two million tons; no real returns are available, but sowings are above average, and prospects excellent."

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The following extract from the Annual Administration Report of the Department of Horse-breeding Operations for the official year 1883-84 will be found interesting. The Assistant Superintendent reports as follows :—On the whole my tour was a successful one ; but in the Etah, Agra, Bareilly, Moradabad, Bijnor, and Badaun districts I regret to say that I found horse-breeding at a stand-still. On the other hand, the Saharunpore, Mozuffernugger, Meerut, Boolundshuhr, and Aligurh districts are progressing favourably, particularly so Saharunpore, Mozuffurnugger and Boolundshahr, which are at present most flourishing districts for horse and mule-breeding in the provinces.

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A very interesting monograph on the cotton manufacture in the Punjab has just been issued by Mr. Francis. From this it appears that the export of cotton beyond the frontiers of the province is very small indeed, and 84 per cent of the entire annual yield is used up locally. It is a peculiarity among the Punjabi women, of all classes, whether high or low, rich or poor, to spend their leisure hour in spinning ; and where it is the pride of a good house-wife to weave all the clothing that her family require. It is therefore not a matter for surprise that very little of the raw material, which is in such great demand should find its way out of the country. The average annual exports from the year 1880-81 to 1883-84 were 137,344 maunds, out of a total of 1,011,815 maunds annually. The Punjab cotton has a tough fibre, much shorter than that of the American varieties ; and even acclimatized American cotton, except under specially favourable circumstances, shows a marked tendency to shorten also. As an indication of the general prosperity of the land of the Five Rivers, it may be said, that rather more than five hundred lakhs of rupees are spent annually by the people on cotton fabrics—an improved condition in the material well-being of the country, which any other province can hardly show. Of course the supply of native material cannot keep pace with the demand, and is insufficient to meet so large an outlay. European goods therefore are largely and increasingly imported, more than three hundred and fifty thousand maunds of European cotton goods find their way to the Punjab ; and the greater portion of the Kohat *lungis* and scarves are woven from Manchester yarns. In connection with these figures, Mr. Francis remarks :—" It seems probable that notwithstanding the competition of Manchester, the Punjabi weaver's trade is rather extending than diminishing, and that there is still plenty of room for both."

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Mr. H. W. Foster, Acting Head Assistant Collector of Tanjore, has reported that an extraordinarily heavy rain-fall was experienced throughout his division in November, from noon of the 3rd to noon of the 4th. At Negapatam, on the coast, 8·70 inches was recorded, while at each of the stations, Tiruvalur and Nannilam, fifteen miles inland, the unprecedented figure of 21 inches was reached. At Kodavasal, about another 15 miles to the west, 7·30 inches was registered, so that it would seem that the storm reached its culmination on the line joining Tiruvalur with Nannilam, eight miles due north. The gauges at both these places are placed on small pillars, and well isolated from trees and buildings, so that there is no reason to suppose that the apparent rain-fall has been magnified by splashings off the ground or drippings from roofs or trees, while the coincidence in the figures at two stations so far apart precludes the supposition that there has been error in measurement. At both stations also the rain-fall had been measured in the two preceding days, so that the previous day's rain cannot have been included. Mr. J. B. Pennington, the Collector of Tanjore, adds, that the heaviest falls on the same day, in other divisions, were 10½ inches at Shiyali, 10 at Mayavaram, 9 at Tranquebar, and 8·32 at Kumbakonam; and the total rain-fall up to the 14th of this month was almost the same for Shiyali and Tiruvalur, *viz.*, 34½ inches, or at the rate of nearly 2½ inches a day for a fortnight.

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ACCORDING to a contemporary the fortnightly returns of prices current, published in the *Punjab Gazette*, show clearly how different the condition of the districts in the south-east of the Province is now, from what it was a year ago. *Joar*, which was then selling at a rate of 24 seers per rupee, in Gurgaon and Rohtak, now sells at 40 and 35 seers per rupee; and *Bajra*, which then sold at 21 seers in Gurgaon and Hissar, now sells at 40 seers and 33 seers. Similarly, the price of gram in Gurgaon has fallen from 23 to 28 seers, and the price of barley from 27 to 36 seers; and though the selling prices of these grains are higher in the adjoining districts of Hissar and Rohtak, they are nevertheless very much more favourable than they were twelve months ago. The curious variations of agricultural prosperity which a district may undergo in the Punjab, can be judged from the fact that, whereas the prices of the common millets were higher in Gurgaon during the second fortnight in December 1883, than in any other district of the Province, they are now lower than those anywhere else, except in the old Rawulpindi Division and Sialkote. The state of the supplies of the market in this part of the Punjab may be imagined, when we say that barley is selling at a rate varying from 46 to 58 seers per rupee, and wheat from 29 to 33 seers. If the present winter rains should prove favourable, Punjab prices are likely to reach an unprecedentedly low point during 1885-56.

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THE following is the official summary of the Bombay Presidency season reports for the week ending January 14:—"Rain in parts of Sind and Gujarat; rabi prospects generally in good condition, except in parts of four talukas of Belgaum and three of Ahmednugger. Scarcity of fodder and drinking water in several talukas of Dharwar and Belgaum. Cholera in parts of Tanna, Kanara, and Rutnagherry; fever in parts of fourteen, small-pox in parts of nine, and cattle-disease in parts of seven districts."

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MR. C. A. COLLIN, Collector of Anantapore, writing on the 7th November, says "that the north-west monsoon has proved a failure in this part of the district, and looking to the statistics of previous years, there is but little prospect of any change in the season at this late date, which would materially alter the present state of affairs. I enclose a statement showing the rain-fall during the current year, up to date, at Gooty, as compared with the last ten years. The rain-fall to date is but little in excess of that registered in the famine year 1876. It will be seen that both the north-east and south-west monsoons have been very scanty, as was the case with the last north-east monsoon also; there have thus been three successive failures. The tanks in this division are consequently absolutely dry, and in the town of Gooty several of the wells are in the same state, and the supply of drinking-water at present hardly suffices for the wants of the inhabitants. The condition of things will be worse when the hot weather sets in, and I fear that there is but little prospect of any material addition to the supply. The dry crops, moreover, have failed, and fodder is very scarce; the cattle have even thus early been driven in large numbers to the hills in the Kurnool district for pasturage, and as comparatively little dry land has been sown during the present monsoon, no great addition to the present supply of straw is to be looked for. Owing to the tanks being dry, the wet lands have been left waste. There will consequently be great difficulty in procuring water and fodder at the time fixed for the exhibition; a large gathering will only tend to increase this difficulty, and owing to the very unpropitious nature of recent seasons, the exhibits from this district would necessarily be few and poor. I understand that the season has been equally unfavorable throughout a large portion of the Bellary district, so that two, at least, of the four districts, for the benefit of which the exhibition is specially intended, are not likely to be adequately represented. The Government, in the season telegram, for the week ending 3rd instant, says, with regard to Bellary: Standing crops, dry and wet, withering from want of rain. Harvest—paddy and dry grains, yield below average. . . . General prospects—fair, except in parts of Bellary and Anantapore, where they continue unfavorable."

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FROM a report on the external trade of Bengal with Nepal, Sikkim and Bhootan, for the year 1883-84, it appears that the total value of the traffic registered during the past official year, on all the important trade routes at 32 stations along the frontier between Chumparun and Julpigoree was as follows:—Of imports into Bengal, Rs. 74,94,083; of exports from Bengal, Rs. 66,92,641. Besides these figures the total value of traffic with other provinces which passed over Bengal was as follows:—Of imports from Nepal, Rs. 1,28,423; of exports to Nepal Rs. 5,56,118; total value of traffic registered amounted to Rs. 1,48,71,315; the gross value of the trade during 1883-84 was 2·44 per cent in excess of figures of the preceding year, and 2·12 per cent over those of 1881-82. The import trade, however, shows a material falling off, the figures for the past year being 8·46 and 7·84 per cent below those of the two previous years respectively. Under exports, there was an increase of 17·11 per cent, as compared with 1882 83, and of 15·21 per cent, as compared with 1881-82. The chief staples in the import traffic which showed the largest decrease during the past year, as compared with 1882-83, were food-grains, timber, and silver; and the articles showing the largest increase were precious stones and pearls (unset), cattle, opium, linseed, and saltpetre. As regards exports, the greatest improvement is found in European piece-goods, metals, provisions, treasure, horses, salt, tobacco, and unrefined sugar, while manufactured woollen goods showed a decrease. To descend to details the total value of the trade of Bengal with Nepal registered during the year 1883-84 was Rs. 1,36,30,623.

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THE gross value of the trade shows an increase of 3·93 and 4·23 per cent, as compared with the totals of the years 1882-83 and 1881-82, respectively. Under imports there is a decrease of 5·07 and 4·85 per cent, but as regards the exports, the figures indicate an increase of 16·18 and 16·62 per cent. The chief staples which show an improvement over the trade of the previous year, are cotton piece-goods (Rs. 4,06,019), precious stones and pearls, unset, (Rs. 3,57,731), miscellaneous rain crops (47,273 maunds), linseed (41,313 maunds), salt (18,330 maunds) provisions other than ghee (13,383 maunds), tobacco (10,406 maunds), saltpetre (8,647 maunds), iron (7,651 maunds), brass and copper (7,426 maunds), undrained sugar (6,921 maunds) and opium (238 maunds); and the articles in which the largest decrease occurred are rice (3,21,755 maunds), paddy (1,13,670 maunds), miscellaneous spring crops (20,909 maunds), timber (1,83,841 maunds), mustard seed (18,113 maunds), hides (11,953 pieces), skins of sheep, &c. (17,478 pieces), and woollen goods (Rs. 67,630).

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THE cattle trade showed an increase of 6,953 head as compared with 1882-83, and of 2,355 head as compared with 1881-82. The figures under imports are 25,277, of which 8,041 were sent into Chumparun, 7,635 into Mozufferpore, 5,972 into Purneah, and the remainder, 3,629, into other districts. The cotton, raw, trade during the year in this staple was 8,862 maunds against 9,767 maunds in 1882-83, and 7,494 maunds in 1881-82. The total quantity exported to Nepal was 8,069 maunds, of which 6,741 maunds were drawn from Chumparun, 521 maunds from Purneah, and the rest from the other frontier districts of Behar. The traffic in European piece-goods showed a great improvement. The total value of the different sorts of these goods exported to Nepal during the year was Rs. 21,35,246, being Rs. 3,15,654 in excess of the figures of 1882-83, and

Rs. 3,00,428 in excess of those of 1881-82 In the case of Indian piece-goods, the exports showed an increase of Rs. 69,491 and Rs. 14,856 as compared with the figures of 1882-83 and 1881-82, respectively. There was a considerable falling off in the import trade in food grains during the past year, the total quantity amounting to 15,45,390 maunds against 19,48,355 maunds in 1882-83, and 16,77,657 maunds in 1881-82. The Collector of Chumparun writes—"Owing to the shortness of the *aughani* harvest and disturbances with Tibet, the export grain from Nepal was stopped for some time. A *chunpatti mahajun,* who cultivates land in Nepal, complained to the sub-divisional officer of Bettiah that he was not allowed to export his own grain." The figures of the import traffic in hides for the past year show a decrease of 11,957 pieces as compared with 1882-83, but an increase of 20,802 pieces as compared with 1881-82.

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The total imports under the head of skins of sheep, goats and other small animals, amounted to 50,275 pieces against 67,454 pieces in 1882-83, and 47,709 pieces in 1881-82; out of the year's imports, 44,466 pieces were registered at Bairagnia in the Mozufferpore district. The trade in brass and copper, and in their manufactures is steadily increasing. The quantity exported to Nepal during the year was 19,541 maunds, valued at Rs. 7,81,640, against 12,323 maunds, valued at Rs. 4,92,920, in 1882-83, and 8,707 maunds, valued at Rs. 3,48,280, in 1881-82. Of the year's supply, 16,253 maunds were exported *viâ* the Chumparun district. The import trade in ghee showed a decrease of 3,113 maunds on the returns of 1882-83, and an increase of 1,358 maunds as compared with 1881-82. The total traffic in all other kinds of provisions amounted to 79,193 maunds against 65,810 maunds in 1882-83, and 1,01,037 maunds in 1881-82. As compared with 1882-83, the import trade showed an increase of 2,065 maunds, and the export trade of 11,318 maunds. The great bulk of the imports was registered on the frontier of the Purneah district, but as regards the exports, the largest supply, amounting to 26,547 maunds, was sent to Nepal through Chumparun; Purneah exported 12,066 maunds, and other stations 5,598 maunds. The large increase in the amount of salt carried to Nepal is specially noticeable, the total quantity being 97,427 maunds against 79,260 maunds in 1882-83, and 81,450 maunds in 1881-82. There was a great recovery in the import trade in saltpetre, the total quantity having amounted to 14,521 maunds against 5,985 maunds in 1882-83, and 12,911 maunds in 1881-82. The principal districts to which saltpetre was consigned in large quantities were Mozufferpore (7,525 maunds), Durbhunga (4,297 maunds) and Chumparun (2,699 maunds. The total quantity of linseed imported into British territory was 41,341 maunds in excess of the imports of 1882-83, and 1,09,778 maunds over those of 1881-82, but under mustard seed, the figures fell off from 81,373 maunds in 1881-82, to 71,150 maunds in 1882-83, and 52,802 maunds in 1883-84.

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The value of manufactured silk exported to Nepal was Rs. 98,383 against Rs. 1,12,867 in 1882-83, and Rs. 52,555 in 1881-82. The statistics of the frontier post of Kutkenwa in Chumparun show that as much as Rs. 81,000 worth of the goods exported during the year were sent to Nepal by that route. The total quantity of drained sugar sent to Nepal was 7,785 maunds against 4,975 maunds in 1882-83, and 5,314 maunds in 1881-82, while the supply of undrained sugar rose from 20,429 maunds in 1881-82 to 20,869 maunds in 1882-83, and 27,786 maunds in 1883-84. Of the exporting districts Chumparun contributed 3,933 maunds of drained and 11,035 maunds of undrained sugar; Mozufferpore 1,145 maunds of drained and 3,587 maunds of undrained sugar, and Durbhunga 637 maunds of drained and 6,069 maunds of undrained sugar The total weight of tobacco registered was 40,004 maunds against 29,598 maunds in 1882-83, and 29,787 maunds in 1881-82. The increase in the import trade was 3,891 maunds as compared with the previous year, and in the export trade 6,515 maunds. Of the importing districts, Purneah received 3,612 maunds, Mozufferpore 2,686 maunds, and Durbhunga 1,192 maunds, while as regards the exports, the largest supply was sent from Mozufferpore (13,360 maunds) and Chumparun (13,018 maunds). The timber trade showed a falling off of 1,83,841 maunds as compared with 1882-83, and of 76,083 maunds as compared with 1881-82. The total value of the export trade in wool, manufactured, of the past year, showed a decrease of Rs. 67,909 as compared with 1882-83, but it exceeded the figures of 1881-82 by Rs. 51,614. The great bulk of these supplies was carried to Nepal by the routes passing through the Chumparun district.

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The total value of the trade between Bengal and Sikkim registered during the past year 1883-84 was—imports from Sikkim, Rs. 2,21,523; exports to Sikkim Rs. 1,12,711: total, Rs. 3,34,234. The advance in the aggregate value of goods registered was Rs. 17,792, or 5·62 per cent as compared with the previous year, and Rs. 80,690 or 31·82 per cent as compared with 1881-82. The improvement was mainly in the import trade, the most noticeable items which contributed to the increase in the year's traffic as compared with 1882-83 being raw wool, miscellaneous rain crops, foreign tea, horses, provisions, spices, gram, and shell-lac. The export trade, however, would appear from the returns to have remained almost stationary, a falling off being shown in the traffic in indigo, cotton piece-goods (European), other metals, cattle and iron, and an increase appearing under tobacco, woollen goods, paints and colours, cotton piece-goods (Indian), brass, provisions, oils, and dyeing materials. The imports of hill ponies through Pheydong showed a small increase during the past year, the total number being 683 against 662 in 1882-83, and 636 in 1881-82. The recorded cattle trade fell off by 65 head as compared with the previous year, and by 26 as compared with 1881-82. There was a decrease of 23·26 per cent under sheep and goats on the returns of 1882-83, but an increase of 17·46 per cent is shown on comparison with those of 1881-82. The figures under lime and limestone showed a great improvement during the year, the total quantity being 6,051 maunds against 1,897 maunds in 1882-83, and 3,179 maunds in 1881-82. The supply of miscellaneous rain crops is steadily increasing, the total quantity during the year showing an advance of 4,009 maunds on the trade of 1882-83, and of 10,597 maunds on that of 1881-82. This is all registered at Rungeet.

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The number of hides registered was 751 pieces against 760 pieces in 1882-83, and only 106 pieces in 1881-82. The quantity of shell-lac rose from 2 maunds in 1881-82 to 9 maunds in 1882-83, and 19 maunds in 1883-84. Brass and copper showed a decrease of 90 maunds as compared with the total of the previous year, and of 343 maunds on the figures for 1881-82. The amount of ghee registered was 96 maunds against 141 maunds in 1882-83, and 111 maunds in 1881-82. All other kinds of provisions, however, showed an increase, the figures for the past year amounting to 71 maunds against 34 maunds in 1882-83. The quantity of untaxed foreign salt fell off from 1,779 maunds in 1881-82 to 791 maunds in 1882-83 and 606 maunds in 1883-84. It is believed that a further decrease will take place, if indeed the import of this article is not entirely extinguished, as recent enquiries have shown that duty-paying salt is consumed at places in Sikkim four marches from Darjeeling. The traffic in spices was active, the quantity imported being 239 maunds against 159 maunds in 1882-83 and 119 maunds in 1881-82. The quantity of the brick tea of Thibet imported during the year was 77 maunds against 42 maunds in 1882-83, and 64 maunds in 1881-82. The Deputy Commissioner of Darjeeling has recently received a few samples of tea manufactured after this method in British territory by Messrs. Cresswell and Company, and he has been directed by the Government of Bengal to facilitate its sale in those markets of his district which are most frequented by Thibetan traders. An allotment of Rs. 100 has been sanctioned for the purpose of paying commission to the shop-keepers who may be entrusted with the sale of the tea.

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In the last report it was pointed out that one of the most satisfactory features in the trade of that year was the beginning of a steady import of wool, of which there is an unlimited supply of excellent quality within a few days' journey from

Darjeeling. The result of the registration during 1883-84 shows that so much as 911 maunds of this article were sent into British territory against only 168 maunds in the preceding year, while in 1881-82 no traffic was returned under this head. It is believed, however, that the wool trade has dwindled during the current year, partly owing to the difficulties placed in the way of traders by the Tibetan frontier officials. There was a slight decrease in the value of manufactured woollen goods (chiefly blankets), but the figures are still in advance of those of 1881-82 by Rs. 13,231. The imports, under "all other articles of merchandise, manufactured," showed an increase of over 111 and 154 per cent on the figures of the preceding two years.

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THERE was a slight decrease of 5·77 per cent in value of piece-goods registered as exported during the past year as compared with 1882-83, but when compared with the figures of 1881-82, a large increase of 46·54 per cent is observed. Similarly indigo shows a falling off of 44 maunds on the returns of the previous year, and an increase of 35 maunds on those of 1881-82. The exports of miscellaneous dyeing materials rose from 26 maunds in 1881-82 to 70 maunds in 1882-83, and 85 maunds in 1883-84. The aggregate total of metals registered as exported was 408 maunds, showing a decrease of 154 maunds on the returns of 1882-83, and an increase of 143 maunds on those of 1881-82. The exports of oils rose during the year to 110 maunds against 61 maunds in 1882-83, and 3 maunds in 1881-82. The advance under paints and colours was 21 maunds, and in provisions 38 maunds as compared with the previous year. The total quantity of salt was 392 maunds against 265 maunds in 1882-83, and 173 maunds in 1881-82. There has been a considerable increase under tobacco, the exports registered during the year amounting to 2,331 maunds against 1,487 maunds in 1882-83, and 709 maunds in 1881-82.

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THE figures given in the registers have been quoted above, but it has been ascertained that they are quite unreliable. This subject has recently been carefully investigated by reference to the railway records and by enquiry among persons in whose house Tibetan traders at Darjeeling and Jore Bungalow are known to have resided. Such an enquiry must necessarily be incomplete, but it has elicited information which shows that the present system of registration is inefficient. The difference is Rs. 1,46,725. The registers show the value of English piece-goods exported by Pheydong as Rs. 27,940. Enquiries among certain merchants show that piece-goods to the value Rs. 27,200 were despatched to Pheydong from Kalimpong, and that goods to the value of Rs. 28,500 were sent from Darjeeling to Kalimpong, for export. The total is Rs. 55,700. Endeavours are now being made to place the system of registration of Sikkim and Tibetan trade on a more satisfactory footing. It is probable that the trade is not less than double the amount now registered, and when it is considered that it has so many difficulties to contend with, through the obstructiveness of frontier officials and the exclusion of Indian merchants, it may be inferred that a large expansion of the trade would follow upon the removal of the obstacles by which it is now impeded. A special report on this subject is under submission.

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THE trade between Bengal and Bhootan was, as usual, intercepted at Ambaree, Hantoopara, and Buxa in the Julpigoree district. The first two stations were kept open for five months, and the third station for ten months of the year. The total value of the trade registered during the past year 1883-84 was—imports from Bhootan, Rs. 96,350 ; exports to Bhootan, Rs. 1,23,000 : total, Rs. 2,19,350. It will be observed that the gross value of trade during the past year was 10·70 per cent in excess of the previous year's figures. The value of imports, however, decreased by 13·54 per cent, while that of exports increased by 41·88 per cent. As regards the imports, the decrease is observable in almost all articles of traffic, notably in tobacco, European piece-goods, rice, betel-nuts, and unrefined sugar. As compared with 1882-83 the falling off in the import of horses was very large, namely, 267, valued at Rs. 20,025. The trade in madder or manjit, on the other hand, was exceedingly active, the increase in the quantity imported being 437 maunds or 590·54 per cent. Vegetables, fruits, and nuts showed an increase of 728 maunds, but ghee showed a decrease of 64 maunds. The figures under foreign tea, however, showed a decrease of 24 maunds. The value of manufactured woollen goods (chiefly blankets) showed an advance of Rs. 1,846. The large decrease of Rs. 3,244 in the value of "all other articles of merchandise manufactured" was due to the falling off in the imports of wax, of which only 21 maunds were registered at Ambaree against 137 maunds in the previous year ; on the other hand, the advance of Rs. 4,301 in the value of "all other articles of merchandise unmanufactured" was owing to an increase in the imports of musk and yaks' tails. The total value of the former amounted to Rs. 5,913 against Rs. 2,491 in the previous year, and of the latter to Rs. 1,860 against Rs. 638 in 1882-83. The trade in European piece-goods exceeded that of 1882-83 by Rs. 4,573. Twist and indigo were for the first time exported to Bhootan during 1883-84 *viâ* Buxa and Ambaree. The exports of rice showed an advance of 2,197 maunds. The quantity of metals fell off from 295 maunds in 1882-83 to 179 maunds in 1883-84. The salt trade showed a decrease of 122 maunds. In manufactured silk goods there was an advance of 46·31 per cent, as compared with the previous year. The exports of betel-nuts were 2,958 maunds against 2,158 maunds in 1882-83. The rise in tobacco from 3,284 maunds in 1882-83 to 4,783 maunds in 1883-84, is specially noticeable.

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ON the 6th of December 1884, the Collector of Coimbatore reported to the Director of Revenue Settlement and Agriculture, Madras, that he was "apprehensive that the proposed show at Erode will not be a good one, and am inclined to think it will be best to put it off. The season has been a very bad one. The crops being out of the usual season will not, it is anticipated, be nearly as good or as fine as usual. The cattle have had a bad time of it ; starved at first in the drought, they are now unhealthy from the profusion of green food. The people are calling out for remission, and are generally out of humour with things. As it is the first show of the kind for some time, it seems a pity it should not be as good as possible. I apprehend that the districts from which exhibits may be expected are not in a better state than this." The recommendation of the Director of Revenue Settlement and Agriculture has been approved by the Government of Madras, and the Erode exhibition has been postponed till the early part of January 1886.

Review.

TEA-PLANTING IN CEYLON.*

I.

"TEA-PLANTING in Ceylon, and other items," is the title of a work, written evidently by a planter, under the *nom de plume* of "Eastward Ho." His object, as set forth in the preface, is to advance the interests of Ceylon, "by calling attention to the unequalled field for enterprise now open here, at a time when fresh blood and capital is alone the great need." But at the same time, while compiling the book, his thoughts have turned to the colonies; feeling certain, as he says, "from as careful a study of the characteristics of the climate and soil, as extant accounts at command have permitted, that, in the indicated localities, the products, as named, will be found to succeed admirably, and not impossibly, become the means of converting into highly profitable property large areas of now waste lands." In treating of "Coffee," he warns future planters against procuring supplies of seed from the produce of either Java, India, or Ceylon trees, or of any other country where the plants suffer from what is known as leaf disease. To this cause he attributes, not only a partial failure, but the utter ruin of the enterprize in Fiji, the Seychelles Islands, and the Straits Settlements. The best plan, therefore, is to use the seed brought from a country where the plants are not affected by the disease. In the opinion of our author, the "Blue Mountain" coffee of Jamaica has a good name, and commands a high price in the home market. But he yields the palm to the two varieties (probably identical) in Brazil, called the "the Visconde de Jaguary," and "Margopipe," which he things will galvanize the enterprise everywhere. Their superiority seems to be universally acknowledged, for the Brazilians themselves are absolutely rooting out whole fields, covered with plants bearing the berry, to re-plant them with these two species. The latter do not only come to earlier bearing, but the yield is far more heavy, and the bean is of superior flavour. As for Liberian coffee, of which so much has been written and spoken lately, "Eastward Ho" thinks that it has disappointed expectations in Ceylon, and whatever may be said of its success in the country where it is indigenous, it is safer not to counsel its cultivation beyond the limits of that country. On Cacao, the author reproduces Mr. Jardine's letter on the cultivation of the plant, which contains a mine of information on the subject, and anybody who wishes to try an experiment in its culture, cannot do better than follow explicitly the directions given therein. Cacao succeeds well in any warm locality exempt from high winds or hurricanes, at a comparative low elevation (say from 500 to 2,000 feet, according to latitude). The variety known as the "creole" is recognised the most favourably in the market, and the high rates now obtaining for "Ceylon" justifies the statement. In writing of the establishment of the cinchona industry, the author very truly observes, that it has proved a blessing to the world at large; besides, the profits derived by the manufacturer unfailingly, and in very many instances, too, to the grower;—exceptional cases have occurred in which the net returns realized per acre, have exceeded £1,000. He considers that the greatest service which *succirubra* has rendered in the past, is, "as a prolific begetter of a superior type of 'hybrids'—stronger in constitution, superior in growth, and, in several instances, *richer than either parent*, in the one alkaloid of high value, quinine." *Calisayas morada* and *verde* are also two valuable species, rich in alkaloids. A *morada* tree is mentioned as 150 feet high, and stout in proportion. The seed of their species is obtained from Bolivia, but there is a drawback in procuring it genuine; the jealous care of the Bolivians, as a body, in their desire to retain a monopoly of the best barks, having proved an almost insuperable barrier. "Cinchona seed," says the author," should be thinly sown, in well drained beds made of a sandy vegetable mould, under chequered shade. Open and sloping waterproof thatch shades, the front supports, say, 5 feet high, answer admirably. The amount of direct sunlight can be very well regulated by a length of calico suspended in front. A certain degree of continuous moisture is of course essential, but frequent waterings should, as far as possible, be avoided, an occasional good soaking gently applied with a fine-rosed watering-can, probably answers best. It is useful, after having sown and given the seed a good preliminary watering, to sprinkle over it about ⅛th of an inch of powdered shaganumor moss." There is a short chapter devoted to 'Cardamoms.' Its cultivation is altogether of a recent date, and, as an industry, must be credited to Ceylon. Here several kinds are indigenous, and the produce collected and sold by natives. The plant grows luxuriantly at moderate elevations, but it has been found to crop up well at an elevation of 4,500 feet. The returns of this industry are very encouraging indeed. One of the most unsanguine and cautious visiting agents in Ceylon, some time back, valued a clearing at £250 per acre. Mr. Middleton, of Coorg, who has carried on this cultivation for years past on scientific principles, has succeeded admirably, his returns being nearly a lakh of rupees a year. The next subject treated of is Rubber. Of all the kinds known to botanists, the species called *ceara* is the most rapid in its growth, and shows a propensity of growing almost anywhere, provided the climate be equitably hot. The question being how best to collect the rubber at a profit, with the least injury to the trees? There are several methods practised, but the two best processes seems to be Wall's and Gilliot's, for which patents have been taken out. In connection with the nutmeg, "Eastward Ho," tells us that the tree does not bear until it is seven years old, and even then it takes seven more years to be in prime yielding condition. In Ceylon each tree gives an annual return of from 3lbs. to 5lbs.; a hundred trees should be planted in a single acre of land; and he recommends that a few should be planted among tea bushes. Nutmeg trees are both male and female, and it is hard to tell the sex unless it is in flower; it is, however, usual to plant one male in a group of about fifty plants of the other sex. In the matter of pepper cultivation, there is an admirable contribution by Mr. Dobree, which almost exhausts the subject. Under the head of "fruits and fibres," mangosteen and pine-apple are prominently noticed. With regard to the former the author says, "it is true it takes many years to come into full bearing, but the fruits are so delicious and highly esteemed that they are always sure of commanding a ready and good sale; thanks to their tough outside shell they will keep sufficiently long to be placed in any local market, and as eventually the tree yields very heavy and regular crops, certain and large profits are to be anticipated from its cultivation;—if not in the present generation—the next." As for the pine-apple, it might be "tinned" for export, and the fibre which "is *the most valuable* of all fibres, rivals silk in quality, and . . . . *price* for the raw article." The writer should not be surprised to hear, it had been valued at £80 a ton, or higher; and at only 5 cwts. per acre, this should pay. Areca Palm is the next in the order of notice, and we could not do better than reproduce what the author says about it:—

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* Tea Planting in Ceylon with other items. By "Eastward Ho," Colombo : Printed at the "Times of Ceylon" Press.

"To correctly realize the position of the 'nut' as a 'staple commodity,' it is sufficient to say that they are in daily use with, it is supposed, not less that 300,000,000 people. This will be better understood by making a mental calculation of the populations of India, China, Siam, Burmah, and the Straits Settlements, Ceylon, Java, and the numerous adjacent islands, the majority of whom, unless it be towards the north of India and China, are consumers. As to the number *per head*, on an average, disposed of *daily*, I can only say that I was pointed out the other day an old Sinhalese man who, so I was assured, considered 12 his just allowance (the poor fellow had not a tooth left, so could only manage the softer *green* nuts), and even quite small children get through two to three a day. But taken 6 per head as a fair basis of calculation, with the fact that it takes about 10,000 nuts to the cwt., though reducing the consuming public to 100,000,000, the result shown is, that the annual consumption amounts to 18,250,000 cwts.; an amount, large as it is, if the truth be known, should, I expect, be more than doubled for the one purpose only of chewing—rolled up in a betel leaf (the betel vine, by the way, is a species of pepper) with a little quick-lime paste, and, if possible, a tobacco leaf added; and of course there are other uses constituting it an article of commerce. An 'areca' tree takes from 5 to 6 years usually to come into bearing; after which it should average 300 nuts per annum, for 20 to 25 years. I have seen many trees with 1,000 and more nuts on at a time; but 300 may be taken as a safe and fair average. The number of trees to the acre should be from 1,200 to 2,000; and, I think, best planted in double-rowed belts, say 3 × 3 in the rows, and 15 feet between the belts; forming avenues over which the trees bend from each side, and in which other products such as cardamoms, ground-nuts, or possibly, even cacao or nutmegs, might be grown."

A little further on, he says:—"So positively little after-care seems a *necessity*, that it almost justifies it being said, that if a man planted up a 100 acres of suitable ground with 'Arecas,' and went to sleep for six years, he would wake up to find himself in the receipt of a good income!" There are some valuable notes on the "Peruvian Cotton." The author is inclined to the opinion that the Yucas, a powerful nation that once inhabited portions of South America, and who were, not aborigines, but had probably migrated from Egypt, carried the cultivation of maize and cotton with them. Though they must have been placed under new conditions of climate and soil, yet after a long series of years they would alter from the original in *form* and *habit*—"thus accounting for the maize being what it is; and Peruvian cotton, no longer an annually grown shrub, but a tree in proportions, and perennial." He is of opinion that over vast tracts of Northern Territory, the northern portions of Queensland, and Western Australia, the species will be found to thrive and yield to as great perfection as in the soil of the Peruvian deltas.

AGRICULTURAL EXHIBITION.

(FROM OUR OWN CORRESPONDENT.)

JULLUNDER, JANUARY 12.

The station of Jullunder has been somewhat empty during the past month. One regiment has left, and its substitute has not yet come in. The 28th Native Infantry and the 88th, British, are both expected here, but they can scarcely arrive before the beginning of spring. They have not yet been relieved at their respective stations, Bareilly and Ranikhet. The Native Infantry will be the first to march in, some time towards the end of February. Meanwhile only one battery, the R-2 R. A., is here, and some of the officers went out shooting during the short Christmas leave. Moreover, the officials almost all availed themselves of the bright cold weather of December, and went out camping into the districts; thus it came to pass that the fine broad streets of Jullunder station and its well laid-out gardens became deserted At lawn tennis some six or eight people assembled, and the bare untrodden courts looked desolate. In church a few heads and bonnets were visible on a vast area of brown benches; and feebly there rose the chant of the choir. During the last days of the month and the year the station suddenly began to fill up again. Officials returned from their tours of assessment and inspection, and officers from their shooting-trip. New-Year's day was ushered in by a midnight service, and a peal of bells from the Church tower. In the morning, between eight and nine, the battery paraded and the guns thundered their salute into the fresh cold air. At eleven a durbar was held in the Civil Lines, which lie close to the city, some three miles from the cantonments The durbar-tent was pitched in the garden of the Town Hall. An address, excellent in style and in matter, and powerfully delivered, by Mr. Gordon Young, the Commissioner of the division, opened the ceremony. His speech was followed by a second address. A third address which a native official tried to deliver, and which threatened to be of great length, was fortunately suppressed in time. The durbar was well attended by Rais and Sirdars, the costumes worn on the occasion were rich and had a festive look about them. A few British officers had put in an appearance. In the evening at six, there was a display of fireworks in the gardens before dense crowds of natives and a gallery of Europeans.

But to pass on from fire-works to something more substantial: an *Exhibition* has been held here during the last fortnight, and this exhibition certainly deserves to be mentioned. For Jullunder is a large division, and the various articles which can be collected from its different districts will always make an interesting collection, and the managers did not confine themselves to the division. As you entered the verandah of the Town Hall, the first thing that struck your eye was a group of small figures, placed on a high pedestal. They represented a Punjabi peasant ploughing his field with a yoke of oxen, whilst close by, a few men are occupied, seated, or stooping, in the various attitudes of field-labourers. The life-like action of the obstreperous steers, the happy manner in which the gait of the zemindar and the fling of his arms are caught up, make this group a perfect work of art, and reflect credit on Mr. Kipling's school in Lahore, where it was modelled. I suppose this ploughman is a symbolical figure; for on a table close by are laid out various kinds of the fruits of the earth, species of wheat and seeds, rice and maize, goor, sugar, cotton, opium, &c, and at the head of the table two gigantic pumpkins attest to the fertility of the Jullunder soil. Then come works of carpentering, most of which have been sent in from Kappurthala or Hoshiarpore. Little of the furniture exhibited presents a pure native style; it is either European, or shows a blending of European and Indian designs. Worth mentioning is an elaborate writing-desk containing a set of drawers craftily hidden, which are opened by the touch of a secret spring; and a lace-machine belonging to Mr. Akbar Ali, in Loodiana, which has already brought its owner a prize of Rs. 50, and which will yet bring him a patent. On a third table the earthen-ware are exhibited, jugs, pitchers, flower-pots, flower-stands, &c., things useful and useless, all made in Jullunder. The hardness of the earthenware, its glare and its colouring, render it superior to Peshawur pottery, and inferior only to that made in Mooltan. On a table close by, a few huge brazen hookha-holders attract our eye, a set of ornate candle-sticks, a number of padlocks from Hoshiarpore, big enough to be used for an Imperial treasury or jail; next we find laid out thick woollen carpets from Alavalpore, muslin, coarse but well-printed, from Phillour, pushminas, and most gaudy purdahs from Hoshiarpore. If the Hoshiarpore men use these purdahs to screen their wives from the world, they at least give them something very pretty as a partition. Some grey carpets from Mooltan show good workmanship, their designs are regular and in good taste. Loodiana carries off the palm in this competition of fineries, with a number of table-covers of black broad cloths of English make, the borders and corners of which are adorned with true Eastern arabesques wrought in gold, with silk pugrees, grey, dark-blue, and lovely violet—with slippers, worked in imitation of the Cashmiri style, with some handsome fulkaris. It is now well-known that many of these Loodiana clothes are made with yarn brought out from England. Loodiana is almost rivalled by Umritsur. Mr. Davee Suhoy Prub Dial sent in an assortment of shawls, slippers, ornamental chogas, etc. Another long table contains miscellaneous articles, amongst which our eye alights on ivory card cases exquisitely carved, on pencil-cases, steel with gold inlaid, on Kangra jewellery, Cashmiri imitation, &c. The Exhibition was crowded with natives from morning to evening. The Raja of Mandi who had come in on a visit, and his followers, helped to swell their numbers—needless to say, the European residents also appeared *in corpore*. The articles exhibited were all offered for sale, and the results ought to encourage the enterprising senders, for pretty well the whole collection of things has been bought up. On New Year's day there was a cricket match between the station and the battery. At the first innings the station scored 115 against 75. But afterwards the fielding became slack, and the gunners, well in practice, walked away with the game. To-day the team of Native Christians play the Battery. Last year the Native Christians won, but I have not yet heard the result of to-day's match. Our military hunters, returning from their shooting-tours, do not give very bright accounts. No snipe, and but few ducks in the *jhils*.

Miscellaneous Items.

Lord Randolph Churchill has reconsidered the invitation of the Sylhet tea-planters, and now proposes visiting their district during the month of February.

Colonel Cadell has succeeded in inducing some twenty Chinamen, belonging to Singapore and Penang, to go back with him to the Nicobars to start the formation of a Chinese settlement.

A correspondent at the Shevaroys, writing on the 12th instant, says:—"We are having some fine cold weather now, but we want a little rain to ripen the coffee, from the want of which the trees are not looking so bright as they should"

The Secretary for Berar reports that the prospects of the *kharif* crops are favorable, except in places where they have suffered from excessive rain. Cholera has appeared in the Akola and Balapore taluks. Cattle-disease prevails in the Basim district.

There is a very high mortality amongst cattle in Assam. Cattle-disease is responsible to a large extent, but it is also strongly suspected that many healthy animals are poisoned by *Chamars* for the sake of their skins, which find a ready market at Tezpore.

The ceremony of turning the first sod of the Baroda water-works took place at Ajwa, thirteen miles from Baroda, with great *eclat* on the 8th instant. In the evening his Highness gave a banquet to the European and Native guests, and there was a display of fireworks.

So late as Thursday last, great lumps of hail amalgam were still unmelted in a shady spot close to the office of a local paper at Lucknow. This fact is more conclusive than pages of descriptive writing, as to the severity of the previous Saturday morning's storm.

Owing to the threatened scarcity in the Bellary district, a sum of Rs. 10,000 has been placed at the disposal of the Collector for relief labor. The Forest Department have also received instructions to permit the cattle of the district to be driven into the forests on the Kurnool hills for pasturage.

On the representation of the Collectors of the Godavari District, that the sum of Rs. 752-8-0 had been subscribed, and Rs. 428 more had been promised, Government have sanctioned the grant of Rs. 500 in aid of the Agricultural Show at Rajamundry, and have asked for a report of the result of the exhibition.

About 300 emigrants will be despatched from Madras in the course of the next fortnight to the Mauritius. The ship *Raja of Cochin*, which returned to Madras a few days ago from the Mauritius, after landing the last batch of emigrants from Madras, will probably be chartered to convey the coolies now awaiting embarkation.

The Australasian statistics for the year 1883 have just been published. The total population of the seven Australasian colonies is estimated at 3,012,451, distributed as follows:—Victoria, 917,310; New South Wales, 843,389; Queensland, 267,865; South Australia, 299,012; Western Australia, 31,238; Tasmania, 124,350; and New Zealand, 529,292.

A contemporary visited the silos constructed by the Commissariat Department at Jellapahar, and was agreeably surprised to find both sheep and cattle eating the food with a fair amount of relish. This much has, he thinks, been fairly established that silos properly constructed of grass in good condition during the rains, will be found of value to all stock producers in the cold weather.

The managers of the Batavia *Zoological* Gardens have applied to the Netherlands India Government for a grant of money, in aid of a scheme to rear carrier pigeons for use in war time. The commander of the forces, reporting favourably on the idea, has recommended a grant of one thousand guilders for the purpose, on condition of the authorities being kept fully informed of the progress made.

In the past month the total quantity of tea shipped from Madras to Great Britain and Calcutta was 8,600lbs., valued at Rs. 8,535. The coffee shipments were almost *nil*, the total quantity sent to Calcutta being only 24 cwt Of cinchona bark the shipments aggregated Rs. 44,775 for 319 cwt. In the month of November, 1,133lbs. were shipped from Calcutta, and 13 cwt. from Beypore. The export trade in tobacco and cigars is steadily on the increase, the shipments last month aggregating 3,068lbs, valued at Rs 2,187. Indian condiments are shipped to England in large parcels; last month, 112 cases were exported to Great Britain, France, Melbourne, New Zealand, &c., of the value of Rs. 3,273.

The Darjeeling correspondent of a contemporary says that the tea season which has just come to a close has been far from successful. Of course, one of the chief causes of poverty of the results was the scarcity of rain. The suggestion, however, that this evil is being aggravated by the reckless manner in which forest and jungle have been cleared to make way for new gardens, is deserving of attention.

A report by a Mr. Van Delden Laerne, on coffee-growing in Brazil, is expected to take up about 500 pages of print. To the report there will be appended two large maps of the coffee area in Brazil, namely, a geological one, prepared at Mr. Laerne's request by Professor Derby, a geologist at Rio, and a physical one shewing the coffee-growing districts and railway lines open for traffic therein, on the 1st January 1884.

A series of tide-tables for the river Hooghly for the current year at Saugor Island, Diamond Harbour, and Kidderpore, have been published by the authority of the Secretary of State for India in Council and of the Port Commissioners in Calcutta. They have been prepared under the supervision of Major A. W. Baird, R. E., in charge of the Tidal and Levelling operations under the Survey of India, and checked by Mr. E. Roberts, of the Nautical Almanac Office in London.

A movement has been set on foot in Tanjore to start an Industrial School, the result of the efforts made some months ago by some of the officials and well-to-do landholders of the district. Tanjore is famous for its colleges and its high and middle schools. From an educational point of view the district is, perhaps, the most advanced in the presidency. An Industrial School, which, we believe, has received the support of the Collector of the district, will, we trust, soon be an accomplished fact.

On the 11th instant the Sutlej river rose, owing to the winter rains, three feet six inches. The flood swept away one of the small boat-bridges at Ferozepore, and breached the large bridge also. The rise and heavy flow continued for about twelve hours, when the river showed signs of abating. The new tramway embankment, under construction by the Sindh, Punjab, and Delhi Railway, was slightly damaged; but beyond this, no other harm was done. The waters have now subsided to their normal height.

The net amount of customs duties collected in Bengal on all articles during the year 1883-84 was Rs. 2,04,87,365, showing a falling off, as compared with the previous year, of Rs. 1,63,282, or 7 per cent. The decline was chiefly due to a decrease of Rs. 1,40,473 in the export duty on rice, which is said to have been owing to a short crop. There was also a smaller decrease in the salt duty, and this also was attributed to the bad harvest throughout the province which had the effect of checking consumption.

Although the silk market in England, at present, is by no means in an encouraging condition, we see that an enterprising French gentleman at Mauritius is about to attempt the rearing of silk-worms in that island. The idea was first entertained by M. Descroizilles, senior, who planted a number of mulberry trees at beau Bassin, where his sugar plantations are, and as these trees have now grown to a considerable size, the present proprietor is about to import eggs from Japan, and to commence the manufacture of silk.

A correspondent calls our attention to the fact that Mr. Rustomjee Manackjee is not the only Parsee capitalist who is successfully turning his attention to agriculture. The wasteland in the Panch Mahals, to which we referred in our review of Mr. Dosabhoy Framjee's "History of the Parsees," has been brought under cultivation, not by Mr. Manackjee, but by Mr. Ardeshar Dalal, of Broach, whose enterprise, as we recorded some months since, has been cordially recognised by Mr. Shepherd, the Commissioner of the Northern Division.

A paper was recently read before the Port Louis Society of Arts, describing the results of a first experiment in the manufacture of quinine, which had resulted in the production of 279 grains of quinine and 60 grains of cinchonidine from 2½lbs. of bark, the variety of which was not stated Having regard to the great prevalence of fever in Mauritius at certain seasons, and to the fact that a yearly sum of about Rs. 1,10,000 is expended in the purchase of home-made quinine, it is proposed to carry on the manufacture on a larger scale. It was stated that the Mauritius cinchona trees are subject to a disease caused by an insect, but unless they are very far gone, the diseased part may be removed and the insect taken out. The cavity is then covered with moss, and has to be kept damp for some days. The nature of the insect did not transpire.

The amount of Indian tea exported from Calcutta in December was 7,157,796lbs., as against 8,587,[illegible]10lbs. in December 1883, and 5,764,837lbs. in 1882. The exports to Great Britain from 1st May to 31st December were 56,[illegible]95,180lbs., and in the corresponding periods for the two previous years they were 47,397,247lbs. and 42,193,623lbs. To Australia and New Zealand we exported 271,454lbs. in December last, and 848,972lbs. from 1st May to 31st December. For America in December the corresponding figures were 12,056lbs. and 61,104lbs. The total exports from 1st May to 31st December were 51,942,345lbs., as against 47,956,206lbs. in 1883, and 45,252,509lbs, in 1882. In spite, therefore, of the fact that the half-yearly exports to the Australian Colonies were far short of the amount despatched in 1882 (2,251,062lbs.), the trade as a whole shows a very considerable advance.

As a relief measure to sugar planters in Netherlands India, the Governor-General has passed an ordinance to be in force for one year, enabling them to hypothecate their growing crops. It is, however, generally held in Batavia that to save the planters from ruin, the native population dependent on the sugar estates from impoverishment, and the estates themselves, when sold off for debt, from passing into the hands of Chinese, this enactment should be followed by others securing sugar-growers exemption from taxation, and lowering railway freight rate.

The yield of apples this year in the New England States is enormous, if not wholly unprecedented. The *Boston Commercial Bulletin* affirms that farmers hardly know what to do with the great crop at their disposal. England is the only market outside the States to which the immense supply can be sent, and hither will come all that can be profitably shipped. Many orchards are said to yielded 500 barrels each, and one farmer has produced 700 barrels of 'Baldwins.' There are some counties in which the crop is quite small, and in others it is hardly worth gathering, but the cause of these exceptional instances of failure is not stated. So much of the supply of apples as cannot find a market in the natural state will be converted into cider and vinegar, of which the prices are expected to be very low. Good 'Baldwins' were being sold in Boston, at latest mail dates, at 6s. per barrel for export. Up to the 25th October this season the shipments of apples from Boston, New York, and Montreal had reached 152,640 barrels. Never before have the exports been so heavy at that date.

Year after year the State Fish Commissioners of Wisconsin and other States have freely stocked the waters of the lakes with young whitefish. Yet year by year the catch of whitefish diminishes until now the extermination of this valuable species of food is threatened. Where do the whitefish go to? The answer is not hard to find. Exhaustive experiments have been made and have proved that the artificial stocking of the lakes through the medium of State fish hatcheries is in itself successful. Healthy young fish by the millions—and more whitefish than fish of other varieties—have been deposited in Lake Michigan, and in spite of any adverse natural conditions, they have lived and thriven. But experiments have proved, too, that whitefish are exceptionally tender; and unlike many other and hardier varieties, they hug close to the shore, where the water is shallow and warm. These shallow reaches of the lake from Chicago to Buffalo are almost literally lined by trap nets, set by the dwellers along shore. In such nets, with fish of larger size, the partially grown whitefish are caught. When the nets are pulled up these latter are taken out and—not preserved for food, but—thrown back into the water dead, being too small for use. Thus thousands upon thousands are killed every year on almost every mile of shore line along the lakes Here, then, is the reason why the food stock of delicate whitefish in the lakes is not increased, but rather steadily diminished year after year. There must be law, and the rigid enforcement of law, prohibiting the use of trap nets, or the fish supply of the great lakes will be exterminated. The law to be effective must be a law of Congress also, for no State law and no combination of laws by different States adjacent to the lakes can meet the case.

Selections.

ON THE QUALITY OF CREOSOTE SUITABLE FOR PROTECTING HOP-POLES, WOOD FENCES, &c., AGAINST DECAY.

By Dr. Augustus Voelcker, F.R.S., Consulting Chemist to the Society.

Commercial creosote, a dark-brown thickish liquid, strongly smelling of carbolic acid, has been used for years past, as is well known, with much success, for protecting from decay hop-poles, stakes, and wooden railings, which, being made from young, and more or less immature or green wood, enter into decay, and become rotten and useless, after a few years, especially on naturally stiff and imperfectly drained land.

The creosoting process has been found so efficacious that it has almost completely superseded the older plans of impregnating wood with corrosive sublimate, as in Kyan's process, or with sulphate of copper, sulphate of iron, chloride of zinc, or other metallic salts.

Recently, however, several complaints have reached me respecting the quality of creosote with which my correspondents were being supplied. The creosoting liquid, it was alleged, when applied exactly in the same manner as in former years, entirely failed to protect hop-poles against decay; and Mr. F. de Laune, to whom the merit is due of having used crude commercial creosote for preserving timber more than a dozen years ago with great success, and of having introduced this protecting liquid to the notice of farmers in his article in the journal of this Society, vol. xviii., part I., p. 259, goes so far as to say that, according to his recent experience, wood impregnated with creosote supplied to him a year or two ago became rotten more rapidly than he believes it would have been had it not been subjected to the creosoting process.

Mr. de Laune's experience in past years, of having creosoted wood with entire success, compared with his recent failures, presents strong presumptive evidence of the quality of commercial creosote having become deteriorated of late years, in some cases to an extent such as to make it unsuitable for the preservation of hop-poles, wooden railings, &c.

Unfortunately, we possess no analytical data upon which a reliable opinion can be based respecting the quality of the creosoting liquid which ten or twelve years ago, and even earlier, had been used most satisfactorily. It is therefore impossible to make a comparison of the chemical composition of the creosote used in former years with great success, with that supplied in recent years, and alleged to be altogether inefficacious as a means of protecting timber against decay.

The liquid used for creosoting timber, known commercially as creosote, is a fluid possessing a highly complex and variable composition.

It is obtained from coal-tar, which, according to the kind of coal from which it is produced, yields the following products on distillation at a temperature rising to about 760° F.—

1. Pitch, remaining behind in the retort on distillation, and constituting the largest proportion of the products of distillation.
2. Naphtha, or benzol, the most volatile of the coal-tar constituents.
3. Ammoniacal liquor, which always mechanically adheres to, or is mixed with, the more specific tar-products of commercial coal-tar.
4. Light and heavy oils of tar.

The latter amount to from 20 to 30 per cent of the coal-tar, and constitute the creosoting liquor which is used for preserving timber.

Commercial creosote, in other words, is the portion of coal-tar which comes over on distillation between the temperature of about 359° F. and that of 760° F. It has a highly complex and variable composition.

Amongst its constituents may be mentioned: phenol, or carbolic acid; cresol, or cresylic acid, closely allied in character to phenol; naphthaline; light tar-oils, passing over on distillation at a temperature of about 600° F.; heavy tar-products which remain behind in the retort at that temperature, *viz*., pyrene, chrysene, leucoline, cryptidine, pyridine, acridine, and other organic bases which occur in minute quantities in commercial creosote.

The products of distillation of the liquid employed for creosoting wood are heavier than water, whilst the distillation products of animal and vegetable oils and fats, such as bone-oil, palm-oil, cotton-seed oil, resin-oil, and also whale-oil, have a lighter specific gravity than water.

Carbolic and cresylic acid, distinguished for their powerful antiseptic properties, were until recently regarded as the most valuable constituents of creosoting liquids, and are still held by some of the highest chemical authorities as the chief constituents upon which the efficacy of commercial creosote as a preserver of timber mainly depends.

This generally received opinion has been called in question by Mr. Boulton, of the firm of Burt, Boulton, and Hayward, the well known tar-distillers, who, in a paper read quite recently before the members of the Institution of Civil Engineers, on the strength of certain practical experiments, a long experience, and the testimony of several chemical experts, endeavoured to show that the efficacy of tar-acids, as antiseptics, has been overrated at the expense of the more stable and enduring properties of the tar-oils. At the same time Mr. Boulton admits that the percentage of tar-acids in the creosote to be used remains a contested matter of opinion.

Notwithstanding all that has lately been said and written in favour of Mr. Boulton's view, it appears to me a hazardous proceeding to rely on the efficacy of a creosoting liquid which contains as little as 3, 4, or even 5 per cent of crude carbolic acid.

In preserving old, well-matured timber, such as is used for railways sleepers, and is less liable to perish than young immature wood used for railings, hop-poles, and light wooden structures, creosote, which is comparatively poor in crude carbolic and cresylic acid, but which is rich in heavy tar-oils, I can conceive may be quite efficacious in preserving such old timber; but when we have to deal with young immature wood, full of sap, I do not think a creosoting liquid, containing as little crude carbolic acid as I have found in creosote recently purchased, can be relied upon for its power of preventing the decay of hop-poles for a reasonable number of years.

Creosote, suitable for preserving hop-poles or wooden fences, in my judgment, should contain not less than 10 per cent of crude carbolic and cresylic acid; and if the percentage of these tar-acids rises above 10 per cent, the creosote will be all the better for the purpose of protecting the poles against decay.

In a sample of commercial creosote sent to me for analysis a short time ago, I found no less than 14·76 per cent of ammoniacal water.

This sample, on distillation up to 610° F., yielded only 39·08 per cent of products volatile at that temperature, including only 4½ per cent of crude carbolic acid. The ammoniacal liquor, amounting to 14¾ per cent, is most objectionable; and 4½ per cent of crude tar-acids appears to me insufficient to neutralise the effect in the sap of young wood of those constituents which cause in wet ground its rapid decay if unprotected. There can be little or no doubt that a creosoting liquor of the character of this sample is altogether unsuitable for the purpose for which it was used.

Not quite so bad, but still anything but good creosoting were two other samples, recently purchased by hop-growe Kent. These samples contained respectively of—

	No. 1.	No. 2.
Distillate from boiling point to a temperature of 610° Fahr	39 08	61·75
Including—		
Crude Carbolic acid	3 per cent.	4 per cent.
Specific gravity of creosote at 60° Fahr...	1·102	1·103

I fear, under the name of creosote, tarry liquors are often sold to hop-growers which are not worth much, if anything, for protecting hop-poles against premature decay; and I would strongly urge upon farmers who are in the habit of creosoting wood, not to buy any creosote unless it is guaranteed of a well-defined quality.

The crown agents of the Colonies, the War Office, and probably other Government Offices, in entering into contracts for the supply of creosote, issue specifications to govern the quality of supplies of creosoting liquors. Tar distillers and dealers in creosoting liquors surely ought to know what they are selling, and farmers will do well to insist upon being supplied with creosoting liquor of a guaranteed quality. I would suggest the following specification, the adoption of which, I believe, would place dealings in creosoting liquors on a more satisfactory footing, and remedy the complaints which have lately been made respecting the bad qualities of creosote.

Specification to govern the quality of supplies of Creosoting Liquor.

1. The liquor must be free from the admixture of any oil or other substances not obtainable from the distillation of coal, at temperatures between about 350° F. and 760° F.
2. It must yield from 65—70 per cent of products when distilled from its boiling point to 610° F.
3. By repeated agitation with successive portions of a solution of caustic soda of spec. gravity 1·125 (25° Twaddell) the distillate must yield not less than 10 per cent of crude carbolic and cresylic acid (crude coal-tar acids).
4. The creosoting liquor shall contain not less than 20, nor more than 30, per cent of constituents that do not distil over at a temperature of 610° F.
5. It should become completely fluid when raised to a temperature of about 95° F., and remain so on cooling down to a temperature of 85° F.
6. The specific gravity of the liquor must not be less than 1,035, and not more than 1,065, water being 1,000, at a temperature of 60° F.

PRODUCTS OF CANADA AND THE NORTH-WEST.

An exhibition of animal, vegetable, and mineral products of the North-Western Territory, particularly of the land lying directly to the west of Manitoba, is now open at 35, George-street, Edinburgh, under the auspices of the Canada and North-West Land Company. One of the features of the exhibition is a large distinctly-marked map, showing the enormous extent of the possessions and the localities from which many of the exhibits have been taken. The samples of cereals shown are obviously the produce of rich and fertile soil, and quite equal in appearance to that grown on the finest British fields. The wheat, which consists of white Russian and Scotch grain, is admirable in colour and solid in kernel. The latter, which is very extensively cultivated, is a favourite variety with Manitoban agriculturists, the land bearing as many as seven or eight successive crops without manure; while timothy grass, specimens of which are also shown, grown for a few years give the land sufficient rest to enable farmers to put it again under wheat. The samples of barley, oats, peas, and beans are also solid and bright in appearance, peas and beans being specially good. The land upon which these and wheats are grown is either clay or sandy loam, the richness of which is abundantly testified by the fine quality and weight of the grain. Another proof of the fertility of the soil is the enormous size of roots, such as mangels, parsnips, carrots, potatoes, &c., it is capable of producing without the aid of manures or any artificial stimulants. The potatoes exhibited are very large in size, and apparently good in quality. An ordinary yield of potatoes in Manitoba is said to range from 250 to 300 bushels per acre. Turnips, mangel-wurzel, beet, squash, and similar vegetables attain large proportions, and the specimens exhibited are said to be of the average size. Of the grasses which cover the prairies and marshes, growing four to eight feet high, and most of which are relished by stock, there are numerous specimens; while the mineral products of the country, consisting of coal, gold bearing quartz, asbestos, and other valuable materials, are represented. Altogether the display, enhanced by a large variety of magnificent photographs of objects of interest to be seen from the Canadian Pacific Railway, which runs almost its entire length through the land of the company, is highly creditable, and, under the management of Mr. L. Bonny, agent, 668 Main-street, Winnipeg, is naturally attracting a good deal of attention.—*North British Agriculturist.*

FORECAST OF THE 1885 LINSEED CROP IN THE CENTRAL PROVINCES.

THE following forecast of the outturn of the 1885 Linseed crop in the Central Provinces is just published by the Officiating Director of Agriculture :—The reports of six districts are still outstanding although due in my office by January 5th, but I think it better to make no further delay on their account, although they include the districts of Nagpur and Raipur which are perhaps the two most important linseed producers in the Provinces.

2. The district reports are on the whole very favourable. Linseed is sown three weeks earlier than wheat, and did not therefore suffer to the same extent as wheat from the early cessation of the monsoon rains. It is reported from two districts that there is a decrease in area owing to the ground having become too hard for sowing, but this is a great deal more than counterbalanced by a general increase resulting from linseed having encroached on land ordinarily sown with wheat, and also from its having been sown on land which bore kharif crops during the preceding monsoon months, but which, owing to the excessive rain, failed to give produce. There is also a steady annual increase in the area under linseed owing to the active demand for it. The export of linseed is, next to that of wheat, the most important feature in the export traffic of these Provinces, and cultivation is steadily responding to the demand of the Bombay market. The increase in linseed cultivation is especially marked in districts such as Nagpur, in which much of the soil is not of sufficient depth for the produce of wheat, and where the growth of linseed is increasing at the expense of the cotton and the millet crops. It does not seem extravagant to assume an increase of at least 10 per cent in the linseed area of the current year.

3 The prospects of the standing crop are also satisfactory. Rain was much wanted for it a month ago, and in some places the plants were beginning to wither. But rain has now very generally fallen and the crop has immensely benefitted. A little harm has resulted in the Raipur district from the ten days of cloudy weather at the end of December, which have been prejudicial to the proper fertilization of the flowers, but after making allowance for this, a full crop may be expected in Raipur as well as in Bilaspur ; and the reports from other districts show that prospects are very nearly, if not quite, up to the average throughout the Provinces.

DISTRICT.		Percentage by which the area under linseed exceeds (+) or falls short of (—) that of previous year.	EXPLANATION OF DIFFERENCE IN AREA.	Estimated out-turn in annas per rupee taking 12 annas to represent an average out-turn.	REASONS FOR ESTIMATE.
Saugor	...	—12	Excessive rain prevented preparation of land during monsoon.	10	Had not rain recently fallen, the prospects would not have been nearly so favourable.
Damoh	...	+25	Linseed has been largely sown in place of wheat, since the land could not be sufficiently well ploughed for wheat, owing to the heavy monsoon rain.	10	The recent rain has in places been insufficient.
Jubbulpur	...	...	No return received.	...	......
Mandia	...	+31	Area has been increased, consequent on increase in demand for linseed.	12	Crop appears very healthy. A little more rain would do good.
Seoni	...	+ 2	......	10	Growth has been checked by lack of moisture at germination time, owing to early cessation of monsoon rains.
Narsinghpur...	...	—15	The monsoon rains ceased early, and the ground hardened before the whole area could be sown.	12	The crop is promising well, but the total outturn will be diminished by the decrease in area.
Hoshangabad	...	+ 9	The area shows a considerable increase in two tahsils, owing to the increase in the demand for linseed.	9	The late rain has been very beneficial.
Nimar	...	+50	Land on which the autumn crops were ruined by heavy rain, has been re-ploughed and sown with linseed.	11	The December rain has proved generally very beneficial.
Betul	...	+ 6	Linseed has encroached upon wheat, owing to the peculiarities of the last monsoon season.	10	Before the late rains the crop had begun to wither.
Chhindwara	...	+ 4	Linseed has been sown on land on which cotton had been spoilt in the preceding monsoon. It has also encroached on wheat.	10	The late rain has been very seasonable.
Wardha	...	...	No return received	...	......
Nagpur	...	...	No return received.	...	......
Chanda	...	...	......	8	Lack of rain has injured the crop.
Bhandara	...	...	No return received.	...	......
Balaghat	...	— 3	Owing to the early cessation of the monsoon rains some land could not be sown.	11	Cloudy weather is injuring the flowers.
Raipur	...	...	No return received.	...	......
Bilaspur	...	+10	Area increasing in consequence of increase in demand.	16	The crop is in excellent condition, and unless damage is done by frost or insects, the outturn will be above average.
Sambalpur	...	...	No return received.	...	......

THE INCUBATION STAGE AND SPREAD OF GLANDERS.

WILL you oblige me with some information on glanders, as I have been unfortunate enough to have four horses shot with that disease in six weeks ? I wish particularly to know how long the disease may remain in the system without showing itself, whether it occurs spontaneously, and whether in the early stages there is any curative treatment ?—ESSEX.—[Glanders, like rabies and some other animal poisons, has an irregular and somewhat protracted period of incubation. When glanderous matter is introduced directly into the horse's body by inoculation, its effects are produced usually within seven days, and are of a pronounced and violent type. When the ass is subjected to such inoculation, the glanders symptoms follow still more rapidly, and with greater acuteness. It is obviously difficult in many cases to determine the exact date at which sound horses have contracted the foul disorder from affected subjects worked, stabled, fed, or watered with them. Cases are recorded where the preliminary shivering, elevated temperature, and disturbed temperature, characteristic of acute attacks, have been observed within ten days after the animal, previously in sound health, had been in contact with a glandered or farcied subject. More frequently, however, the incubation stage extends to three or four weeks, and in some instances to double that period. The incubation stage in this, as in other disorders, is doubtless also modified by the amount and virulence of the contagion, and by the state of the animal receiving it. There is much difference in the power which different horses exhibit of resisting the glanderous poison. Some with impunity live for years in foul stables amidst chronic cases of farcy, which is merely glanders affecting the external glands and vessels, and even with glandered subjects condemned from the next standing. Foul air, bad food, hard work, reducing diseases such as diabetes and influenza, and other depressing causes, are great predisponents of glanders ; but it is doubtful whether any such insanitary conditions actually produce glanders, or, in other words, whether it ever occurs spontaneously. The consensus alike of scientific and practical observation point to glanders, as well as its milder external form of farcy, being determined only by the specific virus. This will appear more obvious, when it is considered how widely distributed the germs of the disorder still are, in spite of the Contagious Diseases (Animals) Act of 1878, and the increasing precautions certainly taken by horse-owners to isolate suspicious cases. In most towns, amongst the hardest worked and worst housed horses, there still continue cases of chronic farcy, which, although sometimes curable, produce acute glanders, not only by inoculation, but by disseminating from their discharges particulate germs, which may develop acute glanders. In considerable studs of hard-worked animals there are, moreover, not unfrequently, suspicious subjects with intermittent or chronic nasal discharge, and which, although quite free of the ulcerated nasal membrane, are really glandered, and prove disseminators of the disease. Still another unsuspected source of the virus are horses with glanderous tubercles in the air passages, producing chronic cough, and perhaps some thriftlessness

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VOL. X.] CALCUTTA :—SATURDAY, JANUARY 31, 1885. [No. 5.

Crop and Weather Report.

[FOR THE WEEK ENDING THE 21ST JANUARY, 1885.]

General Remarks.—Rain has fallen in Sind and in some districts in the North-Western Provinces and Oudh, Punjab, and in the Central Provinces. There has been slight rain also in the Central India and Rajpootana States. Rain fell in some districts of Bengal.

Agricultural prospects continue [illegible] changed since last week. In Madras general prospects [illegible] except [illegible] Bellary and Anantapore, where the standing crops [illegible] poor condition. In Mysore, except in the Tumkur district, standing [illegible] condition. In Coorg the paddy crop has been [illegible] and [illegible] is approaching completion; the out-turn [illegible] gone [illegible] the estimate.

In Bombay the prospects [illegible] are good except in one or two places. Drinking-water and [illegible] are scarce in [illegible]

In the Berars, Hyderabad, the Central India, and Rajpootana States, agricultural prospects continue favourable.

In the North-Western Provinces, Oudh and Punjab, the standing crops are in good condition and prospects are generally very good.

Seasonable weather prevails in the Central Provinces and prospects continue favourable.

In Bengal the rain of the past week has been beneficial to the *rabi* crops which are generally doing well. Harvesting of *amun* paddy and cutting of sugarcane continue, and mustard and *kalai* are being gathered in some places. In Assam crop prospects are good, and in British Burmah fair.

Cholera is abating in Coimbatore, but in Tanjore, Madura, and Malabar the mortality is still high. Elsewhere in the country the public health is generally fair or good.

Prices are falling in the North-Western Provinces and Oudh and in the Punjab.

Madras.—General prospects fair, except in parts of Bellary and Anantapore.

Bombay.—Rain in parts of Sindh; cotton in parts of Hyderabad and other crops in parts of Shikarpore injured by rain and frost; *rabi* prospects good except in parts of Kaladgi and Belgaum; cotton suffering from blight in parts of Dharwar; scarcity of fodder in four talukas of Dharwar and two of Kaladgi, and of drinking water in two talukas of Dharwar; cholera in parts of six districts; fever, small-pox, and cattle-disease continue in parts of several districts.

Bengal.—Some rain fell, benefiting the *rabi* crops which are generally doing well; mustard and *kalai* are being gathered in some places; harvesting of *amun* paddy on low lands is still going on in many districts; cutting of sugarcane continues; prices of food-grains are almost stationary; cases of cholera are still reported from many districts and small-pox from several, otherwise public health good.

N.-W. P. and Oudh.—There was slight rain but beneficial during the week; hail in some places with inconsiderable damage; crops are flourishing, and prospects excellent; the paddy crop promises well; markets are well supplied and prices tend to fall.

Punjab.—Fever nearly disappeared in the Umballa district; health and crop prospects of the rest of the province good.

Central Provinces.—Weather seasonable; rain reported from northern districts; prospects continue favourable; health generally good; but cattle-disease again reported from Raipore; prices steady.

British Burmah.—Cholera severe in Akyab and Prome, slight in Bassein, Tavoy, Henzada, Kyoukphyu, Sandoway, and Thongwa; elsewhere public health, and health of cattle good; crop prospects fair.

Assam.—Weather wet; prospects of sugarcane and mustard good; *sali dhan* nearly harvested; district healthy.

Mysore and Coorg.—Paddy crop nearly harvested; a little coffee remains to be picked, out-turn short and in most cases below estimate; food grains show a tendency to rise, the market being affected by that of Mysore.

Berar and Hyderabad.—Weather clear and cool; cotton-picking continues; *kharif* being rapid; *rabi* crops progressing favourably; wheat 22, and *jowari* 26 seers per rupee.

Central India States.—Weather clear and cooler; slight rain during the week; health good; prospects of *rabi* crops and opium favourable.

Rajpootana.—Weather seasonable; prospects favourable; prices steady; health good.

Letters to the Editor.

PLANTAIN FIBRE.

TO THE EDITOR.

SIR,—I have read with great interest the Government reports anent the late competitive examination of the fibre-extracting machinery in the columns of the *Indian Agriculturist.* However, I am a little disappointed at the result so far, as nothing satisfactory appears to have come out of it, regarding the extraction of fibre from the plantain stems.

On this side of the country, we scarcely come across that moist and humid climate that so well agrees with the fibrous plants, and hence it is that its cultivation is very much restricted here. However, where there is a good market, we find the plantain numbering as one of the local garden crops. This is the case throughout the whole country, being cultivated in some places to such an enormous extent, that it is worth while to devote some attention to manufacture of fibre from its stems.

Hoping to be further enlightened in this direction through the columns of your valuable journal,

AN INQUIRER.

Bombay, January 26, 1885.

Editorial Notes.

IT will surprise a great many of our readers to learn that what is popularly known as lead pencil, is no lead pencil after all, and there has been none for the past fifty years. There was a time when the industry was yet in its infancy, and a spiracle of lead, cut out of a bar or sheet, sufficed to make some sort of marks on white paper or some rougher material. The name of lead-pencil was derived from the old notion that the products of the Cumberland mines, were lead, instead of what it was, *viz.*, plumbago, or graphite, a carbonate of iron, capable of leaving a lead-coloured mark. With the original "lead" pencil made direct from the mines of Cumberland, it was necessary to wet the point, or it would not impart a black colour to the material on which it was used. But since it has become a manufacture the lead pencil is adapted, by various marks, to each particular design. There are different grades of hardness from the three H.'s, that may be sharpened to a needle point, to the three B's that are almost as soft as wax and make a broad mark. Between these two extremes there are a number of graduations that serve all conveniences and all purposes for which a lead pencil is used. These different hardness are regulated by taking the original carbonate and grinding it, and mixing it with a fine quality of clay in varying proportions, regard being had to the purpose to which the pencil is to be applied. The compounds are thoroughly mixed; the mass is squeezed through dies to form and size it, is dried, and encased in its wood envelope.

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IT is an admitted fact that the greatest discoveries of modern times have been made by men who have not only had the patience to carry on experiments, but also the leisure to prosecute their investigations, and above all, personal liberty, which is in fact the *sine qua non* of great achievements. But there have appeared, from time to time in the world's history, men who have been able, in spite of almost insurmountable difficulties, to make discoveries that may be said to have conferred a lasting benefit on mankind. Even the isolation of a prison cell fail to damp the energy of men who are bent on carrying out their purpose. Of such a stamp was the political prisoner Kammerer, the inventor of lucifer matches, who perfected the idea in 1833, within the walls of a state prison. He was a native of Ludwidsburg, and when sentenced to six months' imprisonment at Hohenasperg, he was fortunate enough to attract the notice and to gain the favour of an old officer in charge of the prison, who, finding he was studying chemistry, permitted him to set up a small laboratory in his cell. In those days the steeping system was in use, which consisted in dipping splinters of wood, with sulphur at the ends, into a chemical fluid in order to produce a flame. If the fluid was fresh, the result was satisfactory, but as it lost its efficacy after a time, there was no general disposition to adopt it in preference to the old-fashioned system of using flint and steel, and it was with a view to remedying this obvious defect, and improving on it that Kammerer undertook his researches. Of course, in the beginning, failures were inseparable, but Kammerer was not a man to be daunted by temporary checks or disappointments. He devoted his heart and soul to the work before him. He commenced experimenting with phosphorus, and just before completing his term of imprisonment, he discovered the right mixture, and kindled the first match by rubbing it against the wall of his cell. On being released he commenced manufacturing matches. But, unfortunately, there was no patent law in those days, by which his rights could be secured, and before long he had the mortification to find a well-deserved fortune slipping out of his hands; for Austrian and other chemists analyzed the composition, and imitations began making their appearance. Two years later, that is, in 1835, the German States prohibited the use of these matches, as they were considered dangerous. They were then made in England, and exported to the continent when these regulations were withdrawn, but too late to be of any benefit to the inventor, who became a lunatic, and died in the mad-house of his native town in 1857.

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AN article in a Burmah paper on the probable failure of the rice crop in that province, has given rise to some discussion on the danger to be apprehended by the productive power of the land. Various suggestions have been made to the local Agricultural Department on the subject. Some are for introducing the cultivation of jute, others of wheat, sugarcane, &c., &c. A correspondent, however, is of opinion that no product promises so much as silk, and it is surprising no one has devoted his attention to it. "The country," he says, "abounds in it—wild and cultivated; its quality is second to none in the universe and its cultivation is easy," and that as the trade of the province is expanding, and that the expansion is based on sound principles, he sees no reason why the cultivation of silk should not be persevered in. He shows by statistics that the imports of the article by sea and land, for the three official years ending 1879-80, were by sea in 1878-9, 9 lakhs, in 1879, 11·6 lakhs, and in 1880, 13·6 lakhs; by land they were ·4, ·3, and ·33 lakhs in three years. It appears that silk is not exported by sea, but by land the exports for the same period were 8·4, 10·9 and 9·7; calculating the consumption within the province itself 1·04, 1·07 and 4·20 lakhs respectively in each year, the figures give some idea of the needs of British Burmah in raw silk. The annual average during that period is two lakhs, but "two lakhs," says the writer, "is only a part of the capacity of the country for the consumption of raw silk." A large quantity is manufactured locally. In the towns and villages of Prome, Tharrawaddy, Bassein, Thyetmyo, Shoaygyeen, and Toungoo there are 3,000 breeders who raise worms. There are said to be 900 dealers in silk in fibre, and about 2,000 persons are engaged in converting the fibre, locally manufactured and imported, into cloth. The same authority gives the following figures of the imports and exports by sea and land of silk manufactured during the period above referred to :—

	1878.	1879.	1880.
Imports.			
Sea	... 39·2	50·4	40·
Land	... 10·7	16·6	11·
Total	... 50·	67·0	51·
Exports.			
Sea	... ·05	·04	·02
Land	... 17·3	17·3	23·1
Total	... 17·35	17·34	23·12

Now deducting the latter figures from the former, the balance left is what may be termed home consumption of the silk manufacture: for 1878, it is 32 lakhs; for 1879, 50·6 lakhs, and for 1880, 27·8 lakhs. But in the raw silk the annual average of the home consumption as shewn above is two lakhs, and the conclusion the correspondent, Mr. Manuel, arrives at is, "that the total annual average value of silk, raw and manufactured, consumed in this province during the years from 1878 to 1880 amounts to the sum of nearly 40 lakhs of rupees." It appears that he had suggested the idea to some people in Bombay, and supplied them with these figures, for he says that some of the mills there have sent manufactured articles to Burmah, "displacing, to the extent of the shipments, that which used to be obtained from the United Kingdom." His opinion, and he is thoroughly competent to speak on the subject, is that there is not a province in all India that consumes so much silk as Burmah.

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THE average area under wheat in India in ordinary years, according to a recent estimate, is about 26,000,000 acres, and the average gross production is nearly 7,000,000 tons. Of this area 18,000,000 acres, or 9/13ths, lie in the four British Provinces of the Punjab, the North-Western Provinces and Oudh, the Central Provinces, and Bombay. During the last year a system of monthly forecasts of the condition and prospects of the wheat crop was tentatively started in these four Provinces, and reports for the months of November and December have now been received. In the Punjab the sowings are above the average, and prospects are considered excellent. The area under crop is estimated at 7¼ million acres, the average area being 6¾ millions. In the North-Western Provinces and Oudh, the November forecast was exceptionally favourable. An area of 5½ million acres had been sown against an average of 5 million acres, the seed had germinated well owing to the late October rains, and a bumper crop was predicted. The December forecast, however, is less favourable, as owing to the entire absence of winter rains the young crop has somewhat suffered. "If moderate rain falls in January," the report states "the crop will still be above the average." Rain has fallen in the Province within the last few days, so that the present prospects of the crop are somewhat better than appears from the December report. In the Central Provinces, owing to the early cessation of the monsoon rains, a smaller area than usual has been sown with wheat. The average area of recent rains has been nearly 4,000,000 acres. This year the decrease ranges in the several districts from 5 to 10 per cent. Present prospects are all that could be desired, as owing to recent rain the crop is in an excellent condition. "Were it not for the contraction in area," the report states, "the gross outturn would be above the average."

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THE Bombay report for December has not yet been received, but the November report stated that, "generally speaking, the area and condition of the wheat crop are satisfactory in the Gujerat districts, though the crop area and condition in the Deccan and Carnatic districts are unsatisfactory from want of rain." From other sources of information, it is believed that this is still a substantially correct description of the present year's wheat crop in Bombay. The average area under wheat in the Presidency has been estimated at about 1 3/5 million acres. A special report has also been received from the Berars, which estimates the present year's crop at 845,000 acres, or 5 per cent above the average, and states that the crop is in good condition. The general conclusion from the above is that in respect of over eighteen million acres, or nine-thirteenths of the gross wheat area of India (including Native States), the condition and prospects of the wheat crop are on the whole up to the average, and that a bumper crop may be expected in the most important province of all, the Punjab. Information from Rajpootana and the Central India States, which have conjointly an average area under wheat of abou five million acres, lead to the conclusion that there also the wheat crop, in area and condition, is quite up to the average.

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EVER since the outbreak of cholera in the East and in Egypt, great alarm has been felt in America over the importation of rags from infected districts. This led the Seymour Paper Company to cast about for means of disinfecting them before shipping them to the United States. In December 1883, Mr. C. E. O'Hara, the President, having learnt that boiling water would kill the disease germs in the rags, visited Boston, New Haven, and New York, and enlisted the co-operation of the health officers there. After experiments had been successfully tried, the experts unanimously pronounced their opinion that boiling rags for four hours would disinfect them of any impurities that may be secreted in them. Armed with these credentials the company went to work in right earnest. They got their machinery together in an incredibly short space of time, and forwarded them to Alexandria in February 1884. The machinery consists simply of three large wooden tubs, eleven feet in both diameter and depth, holding each ten tons of rags, and one engine of forty horse-power, and the necessary apparatus for drying by hot-air. No sooner the Egyptians heard of the arrival of the machinery than they commenced bringing in large quantities of rags from the villages surrounding Alexandria, at the rate of from 5 to 15 tons per day, and seventy Arabs were employed in the "spoonah"—Egyptian term for rag-house—dusting them. After the rags been cleared of superficial dust, they were thrown into the wooden tubs and covered with water. Steam from the generating boiler under 60 pounds pressure was then conveyed through a large pipe passing throu h the bottom of the vats to within a foot of the top, and surmounted by a dome-shaped roof. The apparatus is known by the name of "vomiter," and the steam bursts through at intervals, throwing the hot water in the pipe against the roof which scatters it over the rags. By this process the rags are in boiling water within fifteen minutes, and four hours after are taken out and thrown into the drying machines. The change that comes over the rags, after they have been submitted to this operation, can be seen at once; they are not so dingy or dusty as those that were brought some weeks previously without being disinfected. The superviser who remained for upwards of eight weeks, in charge of the machinery at Alexandria, says that during the entire period work was carried on, there were 70 Arabs employed in handling the rags as they came in from the cholera districts, and he did not know of a single case of absence from duty on account of sickness. He accounts for it on the supposition that previous to the rags being conveyed to Alexandria they must have been lying on the ground under a burning sun, which so heated it as to destroy the disease germs. Encouraged by the results, additional machinery have been sent out; the total cost of the latter, including transportation, &c., is estimated at 20,000 dols., and the cost of disinfecting the rags, is a trifle less than a quarter of a cent per pound.

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THE last number of the *Journal of the Society of Arts* publishes, under the title of the "Forests of Russia," a summary of a report drawn up by Mr. Herbert, Secretary of the Embassy at St. Petersburgh, on Russian Forests. Of course, it is a matter of extreme difficulty to hazard speculation as to even an approximate idea of the area covered by forests in the Russian Empire, covering as it does, portions of three-quarters of the inhabited globe. But so far as European Russia and Poland are concerned, it has been estimated by competent authorities to contain 354,572,000 acres. The last returns, however, show that this is an under-estimate and for the 871,576,914 acres in European Russia, exclusive of Poland or Finland, about 367,400,000 acres or 42 per cent is represented as being covered with trees and shrubs, but of this only about 80 per cent, or 292,920,000 acres are capable of bearing forest trees; so that not 42 per cent, but nearly 33 per cent, of the total area of the country may be reckoned as forest land. It is very unevenly distributed over the whole country; some governments have forests to the extent of 50 per cent of their total area, and others not more than 3 per cent; out of the 49 governments into which Russia is divided, in four of them three-fifths of the whole forest land is concentrated, which leaves but two-fifths to the other forty-five governments. The following statistics furnished by the *Journal of the Society of Arts*, will be found very interesting:—Dividing the Empire into seven zones, it would be found that the northern and eastern goverumeuts have 54 per cent of their area forest; those governments adjacent to the Volga, 23 per cent; the governments in the centre of the Empire, 15 per cent; the Baltic provinces, 16·8 per cent; the North-Western Provinces, 23 per cent; the Ukraine, 14 per cent; and the Steppe governments, 1·3 per cent. Of the total area under forests, *viz.*, 183,700,000 dessiatines,* 122,944,000 belong to the Crown, but of this 99,000,000 dessiatines can be taken as productive forest land. In Poland, 787,514 dessiatines belong to the Crown. Up to the 1st January, 1882, 10,872,000 dessiatines of the Crown forests, or only 8 per cent, were under properly regulated forest control. In the North and North-Eastern Provinces the Crown possesses 79 per cent of the forests; in the Volga, 33 per cent; in the Baltic provinces, 27 per cent; in the North-West and Ukraine, 22 per cent.; and in the Steppe country, 15 per cent. According to the population, Russia has 2 dessiatines of forest per head of population; Austria, 0 47; Germany, 0 33; and France, 0 2. Owing to the climatic conditions of the Empire, a great variety of trees thrive in the forests of Russia. If a line be drawn from Orenburg towards the west, through the governments of Samara, Pensa, and Tamboff, as far as Tula, then to Charkoff, Kieff to Vohlynia, it may roughly be said that south of this line deciduous trees will be found to predominate, and coniferous trees to the north of it. The *Pinus sylvestris* is the predominating forest tree, as far as 67° north latitude. It is to be found over two-thirds of the extent of Russia in Europe, predominating in the north, and found in the south only in isolated cases. It is found, however, as far as 70° north latitude, and towards the east as far as the Petchora, 66½° north latitude. The southern boundary where this species is found is at 44½°, but passing over the Steppes it is found again in the Caucasus, at from 41½° to 43° north latitude.

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Abies excelsa takes the second place, and in Finland is found as far north as 68¾°, and extends to the south as far as the north boundary of the black-earth country; in the east the variety *Abies obovata* predominates. The larch (*Larix Europaea*) is only found in Poland. The Siberian larch is found throughout the governments of Olonetz, Nijni-Novgorod, and the Ural as far as the River Sakmara (51¾° north latitude), and yields excellent wood for ship-building. The cedar reaches in the north-east to 64½°, and in the northern part of Orenburg to 51° north latitude, and in the governments of Perm and Volgoda are large forests of this tree whose cones are exported very largely. Of the deciduous trees the following are found:—The birch and its varieties; the oak, which is not found further north than St. Petersburg and South Finland; the aspen, which, like the birch, flourishes almost throughout the country; the lime tree, which is chiefly to be found in the governments of Volgoda, Perm, Kostroma, Kazan, and Simbirsk, and is employed in the best manufactories, and in the making of matting which is largely exported; the red beech, which grows largely in Volhynia, Podolia, Bessarabia, and in the Crimea, and flourishes at heights varying from 1,500 to 4,000 feet above the level of the sea; the white beech, which is chiefly found in the south-west of the Empire, and also in the Caucasus and the Crimea, and in the neighbourhood of Kieff and Poltava it constitutes whole forests; the elm, ash, maple tree, alder, and willow are also found in the different varieties throughout the Empire, as also the wild apple, pear, and plum tree. In the northern provinces the cutting down of trees and sawing them into planks forms a very large and exceptionally profitable trade, and a very large population is employed in floating timber or barges laden with firewood down the rivers to the ports of export or places unable to supply themselves with wood. Thus Kostroma, Yaroslav, Nijni-Novgorod, Kazan, and Viatka supply building timber for the Volga and its lower tributaries, down even as far as the Steppes of the Don. The principal use that the logs floated down the rivers as rafts or sawn into planks are put to in Russia, is that of house-building, for which purpose it is reckoned that 30,000,000 cubic feet are annually used. According to Professor Stieda, out of 1,820,000 inhabited houses in the central agricultural districts, that is, in the governments of Riazan, Tulu, Kaluga, Orel, Kursh, Voronetz, Tamboff, and Peusa, only 74,000 are built with stone and mortar, and in the manufacturing districts, in the governments of Moscow, Tvor, Yaroslav, Kostroma, Nijni-Novgorod, and Vladimir, out of 1,400,000 inhabited houses, only 6,800 are built of stone. The amount of wood delivered from the forests of the Crown amounted in 1880 to 727,000,000 cubic feet, and the income accruing to the Crown from these forests for the same period exceed 13,600,000 roubles, or £2,100,000. Although the income from the forests has increased considerably, about 50 per cent of the gross income is required to cover the expenses of administration, &c.

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* NOTE.—A dessiatine is equivalent to a trifle more than two acres.

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The following is a summary of Messrs. William James and Henry Thompson's Fortnightly Circular, ending 1st January :—The Tea market has been practically closed during the past fortnight, the public sales having been suspended, and only a limited business transacted privately. To-day the auctions were resumed, 4,322 packages being catalogued, of which 3,788 packages were sold "without reserve." The biddings were brisk at slightly firmer quotations for low priced Pekoes and Pekoe Souchongs, but Common Brokens and Fannings were a little cheaper than in December. There was no fine Tea in the sale. The deliveries of Indian Ceylon during December were 5,415,000 lbs. as compared with 4,805,000 lbs. in 1883; the heavy *imports* have brought up stock to 27,076,000 as compared with 24,116,000 in 1883. The shipments from China at date of latest advices were seven million pounds less than last season. The visible supply of Indian Tea, including stocks and shipments afloat, is 31,000,000 lbs. as compared with 30,500,000 lbs. last year at the same time.

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The Lahore paper says :—If the Agricultural Departments, now scattered broadcast over the land, fulfil no other object, they at least deserve the credit of giving a quietus to the many new fads in food-staples, as well as agricultural implements, that enthusiasts wish to be tried experimentally for the good of the Indian ryot. We have seen the *Reana luxurians* condemned, as unfitted for the modest capabilities of this much instructed being; and another illusion is disposed of, in the wise decision of the Punjab Commissioner of Agriculture not to continue experiments in the cultivation of the Japan pea or *Soya Hispida.* This pulse, which was destined by its admirers to be one of the regenerating influences in Indian agriculture, has, like its many predecessors, turned out an almost absolute failure. Where sown, it has either failed to germinate, or where it has germinated, it has failed to come to maturity; or if it has come to maturity, it has given such a miserable outturn, that its cultivation would be a dead loss to the cultivator, who can make more out of his ordinary pulses (*môt*, for instance, or *phaseolus aconiti folius*) than out of the much vaunted Japan pea, of which the Honorary Secretary of the Lahore Gardens says :—"The soy bean is of no particular value as a pulse, and would never have been heard of, except for the fact that, soaked in water, it ferments and produces a brown liquid, the soy of commerce. There is no hope, that if even if the plant grew here, soy could be made, and if it were, the result would be of no advantage to any one whatsoever."

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In a country like India, where the climatic influences at work render it imperative to keep rust off machinery and implements, it is important to keep in mind the following receipt. The St. Louis *Age of Steel* advises the use of 1oz. of camphor, dissolving it in 1lb. of melted butter; take off the scum and mix in as much fine black lead as will give it an iron colour, clean the machinery, and smear it with this mixture. After twenty-four hours, rub clean with soft linen cloth. It will keep clean for months under ordinary circumstances.

The *Paper World* says that a short while ago it has been discovered that an excellent filler and substitute for wood pulp can be made from a pulpy fibrous material, found only in St. Lawrence county, N.Y., and is only known there in a circuit of about one mile. Messrs. Bayand and Stevens, of New York, are manufacturing it into qualities suitable for all grades of paper, and placing it upon the market under the name of Asbestine pulp; most of the larger paper mills are using it extensively, and the demand is growing so fast that the output has had to be materially increased in order to keep pace with the demand.

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Most of our readers are aware that once upon a time a large trade was carried on between the Southern hemisphere and Europe, in the manure known as guano. It was popularly believed to be the excrement deposited by sea birds that visited the islands in the Pacific Ocean. That theory is exploded, and it is now proved that, instead of being produced by birds it is in fact of marine origin, being thrown up by the ocean, though it is likely that birds might have slightly augmented the original stock. The trade in the article, however, has declined considerably. The prevailing belief is that the quality has deteriorated, and its use is not attended with the beneficial results as formerly. According to the *Indian Gardener*, it is more than likely that the quality has remained as it was, but that the land is sick of the one thing used, as it will get tired of bearing one continual crop. Our contemporary advises change in manure as in any other treatment of the land such as ashes, bone-dust, lime, or other stimulants should be tried in turn.

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Some idea of the colossal character of irrigation works in Bengal may be gathered from the fact that the total capital outlay amounts to Rs. 6,37,00,000. This enormous sum has been expended to a large extent upon productive works, the remaining heads of expenditure being—Famine relief protective works, Rs. 30,00,000; Imperial ordinary works, Rs. 8,26,524; and Provincial works, Rs. 79,04,134. The receipts of the canals classed as productive works, in 1883-84, amounted to upwards of eleven lakhs of rupees, but this sum is considerably less than the receipts for the past two years. The balance of water rates outstanding on the 1st of April was Rs. 6,20,287 as against Rs. 5,75,788 in the previous year. The working expenses came to over ten lakhs, so that the net revenue realised was Rs. 1,00,447 against Rs. 1,67,701 in 1882-83. Including interest payable to the Imperial revenue (Rs. 21,60,758) and other charges, the deficit of the year amounts to Rs. 21,10,285.

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From a report on arboriculture in the Hyderabad Assigned Districts for the past official year, we find that twenty-two public gardens and nurseries were maintained from local funds during the year. Of these, six are at district head-quarters, and are managed by or under the supervision of Deputy Commissioners, one at Chikalda, and the remainder at tehsil head-quarters. The total expenditure during the year amounted to Rs. 14,519, against Rs. 14,644 in the previous year. The results of the year's operations were not, on the whole, favourable, owing to the excessive rain-fall. On the 1st and 2nd July 1883, a severe storm of wind and rain caused considerable damage throughout the province; the rain-fall in those two days amounting to 8 inches 25 cents. The garden at Amraoti, situated in the bed of an old tank, was partly flooded for several days, and so much of the subsoil drainage of the higher ground to the south of the garden gravitated through the soil that the seedlings rotted off. The seeds of vegetables and other saleable produce had to be resown, and the late second sowing was not productive of a large crop. Then again, though the rain-fall in the year was 54 inches 77 cents, the heaviest on record at Amraoti, the wells in the Government garden failed in January, and some of the late crops suffered in consequence. The garden at Booldana had a narrow escape from being washed away as the tank above it overflowed, and the bund was injured. Fortunately the rain ceased just in time to prevent the bund being breached. The retaining wall of the tank has since been raised, and the tank is now safe. Considerable injury was also caused to trees planted in avenues and groves.

Among the trees destroyed were some fine cork trees in the avenue at Ellichpore which were uprooted by the high wind. Some of these were cut short, and put back in their places, and are doing well.

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Of the 6,128 seedlings supplied for planting during the year, 2,505 were granted free to cultivators, and the rest were planted in weekly bazaars and along roads leading to towns and villages, in most instances to fill up vacancies. The principal trees planted were mango, jamoon, nim, and chinchwa, while those distributed to private individuals were guava, orange, and sweet-lime. With the exception of Akola and Basim, in which districts trees on new lengths of roads were planted, in other districts attention seems to have been confined to the maintenance of the existing avenues. The returns show that at the close of the year there were 63⅜ miles of avenue planted requiring no care or expenditure, and 71⅝ miles under care and involving cost. Eight new groves were planted during the year in the Amraoti and Akola districts. In other districts operations were directed rather towards maintaining existing groves than to planting fresh ones. There were at the close of the year 17 groves in encamping grounds and 226 groves in other places : the total area of the groves being 508 acres, 14 guntas. Almost every weekly bazaar site in the province is now provided with a grove of trees. These groves are placed in charge of the local committees of the places where they exist, and all expenditure in connection with them is incurred through these local bodies.

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A large number of trees are planted yearly by cultivators and others. The increase in the number of mango trees is most marked, especially about Akot and the villages under the Satpura range. In the Booldana district the owner of the site forming the encamping ground at Chikhli preferred to plant some trees on it himself, rather than to allow the Deputy Commissioner to do so, as he wished to mark his rights over the ground they were to stand in. No experiments in new kinds of trees were made during the year. Some Japan pea seed was put down in the Amraoti and Akola gardens, but the unusually heavy rains greatly affected the yield. The experiment will be repeated during the current year. Of the foreign trees planted in previous years, the *ficus elastica* in the Ellichpore Government garden is making good growth. At Chikalda, in the gardens there, it is well established. The Australian oaks are this year doing well in Ellichpore, and the *pithecolobium saman*, or rain-tree, is growing vigorously. The carob tree grows well in the Booldana garden.

⁂

An experiment, in the direction of introducing coffee cultivation into Assam, is being tried in the Nowgong district, where Mr. C. A. B. Anderson has obtained grants of two plots of land, measuring 685½ acres. As regards the success of his undertaking, Mr. Anderson lately furnished the following note to the Chief Commissioner : "I have 100 acres of coffee plants put out, mixed Arabian and Liberian. The former appears to thrive far better than the latter, which I have given up planting. I have large nurseries of Arabian seed in, for future extensions, and a small nursery bed of Maragogipe coffee from Brazil. I imported 100 Tamil coolies from an estate in Ceylon. The mortality was very high last year, but they are now thoroughly acclimatised, and work well. The land is granted on specially favourable terms by Government, the venture being the first hereabouts. I have planted a few rubber trees and also some cinchona, all of which appear to thrive well. The land is from 300 to 2,800 feet above sea level."

⁂

A Ceylon paper says :—"Our estimate framed early in October for the exports of season 1884-5 was 385,000 cwt. (against 360,000 cwt. given two months later by our daily contemporary) ; but from all we learn now, we doubt if more than 320,000 cwt. will be made up. On the other hand, it is very certain that of cinchona bark, we have still such reserves, that if the price continues encouraging, we can ship during the present season a good deal more than we ventured to estimate. The scare which arose over cacao, in connection with the effects of drought, want of shade, and of *Helopeltis* during the early and middle part of 1884, has nearly died out, and the plantations well established in the Kandy and Matale districts are recognized as permanent investments of value."

⁂

The value of Indian statistics, says the *Pioneer*, may be estimated by a glance at the tabular statement published in the last local *Gazette* of the deaths registered within the limits of the larger municipalities in the N.-W. Provinces during the week ending the 14th of January. Here we find, for example, Allahabad with a population of over 150,000 registering only 12 deaths, all causes included, during the week. This gives a death-rate of only 4 per annum for every 1,000 of population, men, women, children, and infants all included ; so that each individual in this favoured spot has the average prospect of attaining the ripe old age of 250 years. If this be the nature of the statistics relating to "the larger municipalities," what value may be attached to those of the smaller municipalities, and what to those of the country villages which have not the advantage of supervision under the keen eye of the Municipal Commissioner !

⁂

A land question is engaging the attention of planters and other landholders in the Wynaad. The Government is organising a re-settlement of revenue, and at a meeting held at Vythery, Mr. Castlestuart Stuart, Special Assistant Collector, Nilgiris and Malabar, attended to explain the intentions of the authorities. He pointed out that the settlement would be for 30 years, and all lands capable of cultivation, though yielding no revenue to the occupants, will have to pay tax. The rates of assessment are not yet fixed, but probably will be settled within the next six weeks. Partial abandonment of estates after the re-settlement will not be permited ; the whole of the land will be subjected to assessment, whether any portion be abandoned or not. The meeting thanked Mr. Stuart for his information, and passed resolutions thereon, representing to the Government that "the existing rates of taxation are as heavy as can possibly be borne in the present state of extreme depression," and deprecating any action that would tend to increase their burdens until the views of the planters and landholders can be laid before Government. A Committee was appointed to draw up a memorial to his Excellency the Governor of Madras in Council, showing how the proposed taxation may affect European planters injuriously.

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Unlike planters in Ceylon, the owners and managers of coffee estates in Java do not care to ventilate their troubles in the columns of newspapers, and thus it happens that we at a distance know little or nothing of the spread there of the dire pest, leaf-disease. Two years ago we heard of it incidentally, and we knew that a reward had been offered for the discovery of a remedy ; but from that time nothing has appeared in the Java papers. We are assured, however, that, for all this reticence, the disease is committing sad havoc on most estates, causing a great deal of anxiety to estate owners. What steps, if any, have been taken to check the pest we have not heard, but private advices allude to it very despondingly, the more so that the other great Java industry—sugar—is suffering from low prices.

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We have to thank the Government of New Zealand for the annual Blue Book on the statistics of the Colony for the year 1883. It has reached us too late to give an exhaustive review of its contents. We will take an early opportunity of doing so. In the meantime we have much pleasure in producing a summary of statistics in a few articles of export :—The quantity of wool exported from the colony during 1883 amounted to 68,149,430 lbs., valued at £3,014,211. The quantity exported is in excess of that for the year 1882 by 2,826.722 lbs. The export of wool has greatly increased during the ten years ending December, 1883 :—

	Wool exported. lb.
1883	68,149,430
1874	46,848,735
Increase for ten years	21,300,695

As remarked by the Registrar-General in the previous report, "the annual production of wool is better estimated by a statement of the exports for the twelve months ending the 30th September, that is, immediately preceding the commencement of shearing." The exports for the last ten years, ending respectively on the 30th September, are accordingly given :—

	Wool exported. lb.
1874	46,498,782
1875	49,942,148
1876	56,624,304
1877	56,520,278
1878	62,166,251
1879	62,644,497
1880	62,586,189
1881	60,477,151
1882	64,402,712
1883	71,842,949

But, in addition to the wool exported, a large quantity of that produced in the colony is now utilized at the woollen manufactories. It has been estimated that 1,900,000lbs. were taken for consumption by the mills in the year 1883, so that the actual produce of wool in New Zealand for the year 1883 may be stated in round numbers at 73,750,000lbs.

⁂

The value of the wheat exported in 1883, as shown above, exceeded the value for the previous year by the large amount of £331,085. The increase in the quantity exported was 1,708,919 bushels, or 54 per cent. The value of oats exported in 1883 was greater than that for 1882 by the sum of £32,387. The increase in the quantity exported was 640,080 bushels, or 65 per cent. The quantity of wheat exported in 1883 was 4,897,540 bushels, and of oats 1,619,764 bushels. Ten years previously (1874) the export of wheat amounted only to 933,314 bushels, and that of oats to 135,959 bushels. The quantity of gold actually exported from New Zealand during 1883 amounted to 222,899oz., valued at £892,445. The export of gold has fallen steadily since the year 1880, when the value amounted to £1,220,263. In the year 1874 the export was £1,505,331. The value of gold entered for duty for exportation during the years 1882 and 1883, shown according to the districts in which produced, will be found in subjoined table :—

Produce of the Gold Fields in the Districts of—	1883. £	1882. £	Increase or Decrease. £
Auckland	163,618	131,007	Increase 32,611
Wellington	...	37	Decrease 37
Marlborough	2,524	5,400	" 2,876
Nelson and Westland	474,876	532,472	" 57,596
Otago	352,334	333,804	Increase 18,530
Totals	993,352	1,002,720	Decrease 9,368

The total quantity of gold entered for duty for exportation from New Zealand up to the 31st December, 1883, amounted to 10,322,333oz., valued at £40,457,495.

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More kauri gum was exported from New Zealand in 1883 than during any previous year. The quantity exceeded that exported in 1882 by 985 tons. Taking the different exports in order according to the total value of each, that of kauri gum (£336,606) stands for 1883 as fourth in importance. The tallow exported in 1883 is shown to have been £67,619 in value over that exported in 1882. The increase in quantity exported was 32,405 cwt., or 29 per cent. The timber exported in 1883 was valued at £149,256; the export for 1882 amounted to £114,700; but in 1881 the export only amounted to £71,328; so that a considerable development of this industry has recently taken place. In 1874 the export was only £44,450. The expansion of the Frozen Meat trade in 1883 was marked. The value of the exports for 1882, 1883, and the March and June quarters of 1884, are quoted :—

	Cwt.	£
1882	15,214	19,339
1883	87,975	118,328
March and June quarters, 1884	132,087	183,113

The rabbit-skins were exported in 1883 to the large number of 9,891,805. Ten years previously the number exported was 56,504. The value for the year 1883 being £100,955, this article of export stands ninth in order of importance. The figures in the table above shows considerable development under the heads—hops, grass seed, and preserved meats. The value of the exports from each of certain ports for the years 1883 and 1882 is given for purposes of comparison :—

Principal Ports.	Value of Exports. 1883.	1882.	Increase	Decrease.
Lyttelton	£1,944,035	£1,655,005	£289,030	
Dunedin	1,789,857	1,701,300	88,557	
Auckland	1,067,326	975,301	92,025	
Wellington	1,027,816	782,527	245,289	...
Napier	481,089	624,002	...	£142,913
Invercargill and Bluff	311,285	355,098	...	43,853
Timaru	237,000	111,161	125,839	...
Oamaru	87,649	100,527	...	12,878
Kaipara	58,512	52,789	5,723	
Poverty Bay	32,637	21,550	11,087	...
Greymouth	8,919	183,100	...	174,181
Hokitika	919	67,560	...	66,641

The total trade of New Zealand for the year 1883 amounted to £15,070,037, or £28 9*s.* 5*d.* per head of the mean population, exclusive of Maoris. If the Maoris (according to their number in the year 1881, 44,097 persons) be included in the population of the colony, and assumed to be consumers of imported articles to the same extent as Europeans, the trade per head of population will be found to amount to £27 6*s.* 4*d.* Doubtless they actually consume less, but any deduction on this account must be made on assumption, and vary according to opinion.

Review.

TEA-PLANTING IN CEYLON.*

II.

We now come to that portion of "Eastward Ho's" pamphlet, which treats of the cultivation of Tea as an industry in the island. It need not surprise our readers to learn that there are ample proofs to show that Ceylon is unquestionably the tea-planters' "El Dorado" of the future. The profits that are steadily being realised, the opportunities offered for investment of capital in this enterprise, and other indications of a prosperous speculation—all point to the conclusion that before long, as regards the existing tea-producing countries, the first place must be conceded to her. To give an idea of what may be expected from the industry in Ceylon, and the position it is likely to attain to, our author has appended two communications which have recently appeared on the subject in the local papers. They are thoughtfully and carefully written by two gentlemen, whose connection with tea-planting render their utterances of great value. Mr. Armstrong's interesting paper was read before an appreciative audience, composed of the members of the Dikoya Planters' Association. He has given, so to speak, broad directions in the management of a garden from the time the seed is put into the ground, up to the time it is packed for export. According to this authority, tea will grow from almost sea level to over 6,000 ft., provided the soil and aspect are suitable.

Speaking of the former, he says :—"It should be fairly good—the richer the better—deep and friable, loam well mixed with sand. A shallow quartzy soil is not good. Tea will not flush readily in this, although it may grow to a fair-sized bush. A subsoil, well mixed with sand, or grit, without showing a very good suface soil, will, although giving a slower growth at first, turn out a better paying soil than one with a rich surface and clearly defined clayey subsoil without an admixture of sand; the more we pluck, the deeper the roots must go, and we must have room for them. The higher our elevation, the richer should our soil be to make up for climate.

* * * * * *

The higher the elevation, the less rainfall is required, and *vice versa.* Light showers, alternating with sun, if we could order them so would give us 1,000 lbs. an acre at 5,000 feet elevation. At the higher elevations, continued rain at the height of the monsoon has the same effect in checking the flush, for the time being, as a long continuance of sun has in the low country. Perhaps a good thing; for with us the bush has no wintering, and the only rest, that of a 10lb. plucking, instead of a 24lb."

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* Tea-Planting in Ceylon with other items. By "Eastward Ho." Colombo: Printed at the "Times of Ceylon" Press.

In the matter of seed he says :—"The greatest care must be taken to ascertain that the seed you obtain is from the highest class hybrid, as, with a poor jât, neither care in the manufacture or cultivation can make a good liquoring tea, or give a profitable yield. Making allowances for poor plants, accidents, bad plants, and the having ample plants over for supplies, I calculate on the maund of 82 lbs. for 6 acres planted 4 + 4 ; a maund of locally-grown gives from 27,000 to 33,000 seed according to the time that is allowed to elapse in weighing after husking ; the sooner the seed is in the ground after gathering, the better."

As regards "plucking," he considers it a most important work which requires close supervision. It can be begun at 30 to 40 days after light pruning, and should not be begun till "the bud with opened leaf attached, and half the next leaf, can be plucked at one operation, *leaving on* one, or sometimes two, fully-formed leaves to carry on the young shoot. The shoulder of the half leaf plucked remains on, and protects the eye at its base, which in its turn throws out a shoot. Shoots, according to elevation, will measure 6 in. to 9 in. long *before* the first plucking, after pruning takes place. In after-plucking, a good deal depends on the number of leaves on the shoot. If, with the bud and its partially opened leaf, we have four full leaves, then I should pluck at the second leaf down (leaving on the shoulder of this leaf, which protects its bud, and will probably give red leaf if removed) at one operation, and again half the third leaf at another operation, leaving one fully formed young leaf on the shoot. Towards the end of the season, when the bushes are well up, I would act as above, only plucking at the third leaf, leaving its shoulder on the stem, and thus removing at one operation a half leaf and the shoot consisting of two leaves and the bud. One simple rule in plucking is, to avoid leaving a bare shoot without a single leaf to help it on. As in most things, a practical lesson is best in plucking. As for the number of days in which it is necessary to go round the garden, I learn, at a low elevation, it is considered necessary, according to the time of year, to get round in 7 to 10, up to 12 days at the longest. At high elevations I have found in my *best* months, I should get round in 10 or 12 days to keep pace with my flush, and, again in 15 to (in the very cold weather, December to January) 20 days. I do not think any hard-and-fast rule should be laid down, at any elevation, as to time. It is for the manager to watch his flush, and wait on it, *just* long enough, but no longer ; and not to rush violently round his estate in a given number of days, which *must* lead to over-plucking, which means a reduction in yield sooner or later, although, perhaps, higher prices, for the time being. The benefit of tins is also in a way nullified by a smaller out-turn."

We regret that want of space prevents our following more closely Mr. Armstrong's directions in staking, topping, rolling, fermenting, and packing tea ; suffice it to say, that those who are engaged in its cultivation, should consult the pages of the pamphlet for such useful and valuable information as it is likely to give. Before closing our review of this interesting work, we would reproduce a few figures from the prospectus of the Ceylon Tea Estate Company, Limited, which is embodied in it. Expenditure estimated for the first year for 500 acres of land is given at Rs. 36,450 ; for the second year, Rs. 23,650, with an additional 150 acres opened out during the latter period ; expenditure during the third year, Rs. 26,480 ; making a total of Rs. 86,580, to bring the whole land into bearing. Out of this, deduct for 20 acres of forest land purchased, but not opened, Rs. 6,000 ; cost of open land, Rs. 80,580 ; cost per acre, Rs. 268 per acre of cultivated ground. The remaining 200 acres of forest will be left for firewood, grass fields, for feeding manuring cattle, and on ridges for burnt earth for manuring. Against this must be set crop picked during third year, from 150 acres, at 100lbs per acre, 15,000lbs. tea, at 60 cents, Rs. 9,000, which, as all expenditure is provided for, would pay ten per cent on capital. In this progressive way, the calculation is made to the end of the sixth year, when there is shown a profit of Rs. 34,950, or 40 per cent on the capital raised.

Miscellaneous Items.

A census of Simla will be taken during the present "season." It is some years since the last census was taken.

A species of wild potato has been discovered in the mountains of Arizona. The vegetable is about the size of a walnut.

The American Anthracite Coal Companies have resolved to limit their output during the current year to 30,000,000 tons.

The Sultan of Pahang has presented the Government of Victoria with a tin alligator moulded from tin found in that state. His object is to show the resources of his country.

The number of steam and water mills for dressing grain in New South Wales is 154, representing 2,847 horse power, the number of hands employed being 685.

Some one in Madras has made up his mind to compete with Chittagong in supplying Rangoon with eggs, and has just sent over a first consignment of 18,000,—rather late for the elections.

Mr. John Marshall having resigned the chairmanship of the Bombay Cotton Trades' Association, the deputy chairman, Mr. Cassels, has been elected chairman, and Mr. Glade deputy chairman.

The trade in salt in Burmah has been unusually large lately ; the imports from April to December were 1,159,235 maunds, against 888,807 maunds during the same months of 1883 The exports to Upper Burmah were 858,031 maunds against 292,322 maunds.

Owing to railway communication with Pondicherry not being restored yet, since the recent heavy breaches on the line, the Madras Salt Department is forwarding by sea a large quantity of salt required at Pondicherry. About seven hundred tons of salt are now being shipped in the ship *Soteria* to be conveyed to that port.

The Pondicherry harbour project seems likely to go ahead. A party of engineers were engaged last week in surveying and taking levels at the eastern or Pondicherry end of the proposed works. We believe it forms part of the scheme of the Franco Indian Coal Mining Company, which has already obtained valuable concessions from the French Government.

A Conference in connection with the Industrial Remuneration Trust, for the discussion of the labour question, was to be held in the Prince's Hall, Piccadilly, on the 28th, 29th, and 30th instant Sir Charles Dilke was to act as president, and Mr. Shaw-Lefevre as vice-president ; and 120 associates of a political and social character was to be represented by delegates at the conference.

The Japanese begin to grow alarmed, says the local *Mail*, of the 9th ultimo, about the constant recurrence of earthquakes. They recall how the great catastrophe, more than a quarter of a century ago, when Yedo found itself one morning, surveying its own ruins, was preceded by a succession of petty, premonitory shocks, precisely similar to those recently experienced.

Six petitions from agricultural associations in favour of protective duties on farm products have been referred by Prince Bismarck to the Federal Council. They demand that the duties on corn, cattle, and wool be increased fourfold, and that the gold standard be abolished. The decision of the Federal Council with regard to these propositions is awaited with much interest.

The College of Science Geological Excursion Party started for Kattywar on Wednesday by the Bhownugger steamer. The party consists of forty students under Dr. T. Cooke, the Principal, and Messrs. S. Cooke, Page, and Moos. They will be the guests of the Thakore Saheb during their stay at Bhownugger. After a visit to Gogo and Perim Island they go to Joonaghur and the Palitana States, and return to Poona by about the beginning of next month.

Of late a new article of commerce appears to have come into demand in Bangalore, and promises to be a lucrative trade while the season lasts. The article is the rind of the orange, which is now being purchased, *from those who collect it in the streets*, at Rs. 2-8 a maund. We believe the skins are sent down to a Madras firm, but for what purpose has not been ascertained. Probably the rind is used for the purpose of extracting the essential oil it contains.

Messrs. B. F. Willnecker & Co., of Bombay, have just introduced into India a preparation, which they claim not only preserves wood, leather, paper, &c., from the attacks of white-ants, but guards them against dry rot, fungi, and other climatic influences. Since the substance has been advertised numerous enquiries have been made regarding it, and we understand that it has been successfully employed by firms who suffer great loss annually from the raids of whiteants. If Anti-Merulion possesses a tithe of the virtues claimed for it, we have no doubt it will command a large sale in this country.

An agricultural exhibition is to be held at Nariad under the patronage of H.E. the Governor, H. H. the Gaekwar, and H.H. the Nawab Saheb of Cambay, in the early part of March. The show will be divided into two sections—one for cattle and the other for agricultural produce, and each section will be subdivided into various classes. The prizes for cattle will amount to Rs. 450 and for agricultural produce to Rs. 850. A strong committee has been appointed with Mr. Spry as president.

The present condition of Mysore is such as to cause anxiety, the anticipations of scarcity and dearness of grain-stuffs having begun to be realized. The country is drying-up fast, and the outlook is, in consequence, gloomy, for we cannot expect rains for five or six months, and if last year be any criterion of this, it will be eight months before the province will be refreshed with rain. The gram crops are fair, but as other food grains are scarce, gram will, we may be sure, be also dear.

An interesting report submitted to Government by the Director of Revenue Settlement, Madras, shows that out of a total area capable of being irrigated, throughout the whole Presidency, of 5,039,093 acres, 4,712,932 acres, or 92·5 per cent, are occupied and yield a revenue (exclusive of remissions) of Rs. 2,19,50,618, which is an average of 4·65 rupees per acre, of which, speaking roughly, 25 per cent, or 1·16 rupees per acre, represents the land tax, and 75 per cent, or 3·48 rupees per acre, the charge for water.

Two numerously signed petitions have been forwarded by the Indian residents of Singapore and Penang, against the Indian Immigration Ordinance V. of 1884. The Singapore petition, which was signed by over 1,200 Indian subjects, is addressed to the Secretary of State for the Colonies; the Penang petition signed by nearly 1,000 Indian subjects unconnected with agricultural labour, is addressed to the Governor of Madras in Council, but copies of it were also forwarded to the Viceroy and to the Secretary of State for the Colonies.

The trade in rice and paddy with Upper Burmah shows an enormous increase—in fact, it has more than doubled. The following are the figures for the nine months:—In 1883, rice, 270,513 maunds; in 1884, 950,868 maunds. Paddy, in 1883, 661,360 maunds; in 1884, maunds 1,029,335; total for 1883, 931,873 maunds, and total for 1884 1,980,203 maunds. This result is partly due to a very bad harvest last year, and partly to a reduction of the area of cultivation, in consequence of the misgovernment of King Theebaw having driven so many of the cultivators out of the country.

A series of tables showing the extent in statute acres and the produce of the crops for the year 1884 in Ireland was issued lately. The total extent of land under crops was 4,872,744 acres, of which 1,962,487 consisted of meadow and clover, 1,348,444 of oats, 798,952 of potatoes and the remainder of wheat, barley, rye, beans, pease, turnips, wurzel, beet, carrots, parsnips, cabbage, vetches, flax and rape. The amount of meadow hay and clover produced was 3,822,775 tons; potatoes, 3,040,352 tons; turnips, 3,507,924 tons; oats, 18,109 448 cwt.; wheat, 991,654 cwt.; barley, 2,675,789, and flax, 2,505,850.

The Ceylon Planters' Association has resolved—"That this Association emphatically protests against any increased burden of taxation, both because the planting community is suffering from severe depression owing to the partial failure of the chief industry of the colony, namely, coffee; and because it considers that the funds so raised are not necessary for the development of the resources of the country;" and "That in the opinion of this Association the policy of attempting to restore large irrigation works has no justification, and is the main reason for an unnecessary increase of taxation."

The plan of compressing green fodder in stacks above ground, instead of in silos, long practised to some extent by Dutch farmers, has been tried in England during the past season. A Hampshire farmer reports a successful experiment of the kind. He carted some grass as soon as it was cut, stacked it in the ordinary way, and weighted it every evening with about two tons of railway metals, of greater length than the width of the stack, which was nine yards long and five yards wide. By this means a large quantity of grass was compressed into a small space. When the stack was finished, the loose grass from the side was pulled out and put on the top, which was not thatched. The result is about 50 tons of very good fodder, similar to silage. There is some waste at the sides and on the top, but not more, it is said, than is commonly found in silos.

The young Nawab of Mamdot is to be congratulated on the annual horse show at Jellalabad. This year, nearly three hundred animals were exhibited, and Rs. 600 was given away in prizes by the Government,—exclusive of the amount given by the Nawab out of his private purse. A native correspondent writes that, at the conclusion of the show, the Nawab was decorated by Colonel Corbyn, Deputy Commissioner, with a silver medal, as an acknowledgment from the Government of the young Chief's energy in starting so valuable an institution. In returning thanks for the honour, the Nawab expressed his gratitude to Colonel Grey, C.S.I., under whose charge he had been during his minority. Some eight or ten military officers were entertained at Jellalabad by the Nawab; and it is almost unnecessary to say, that sports of all kinds were organised for the occasion. A polo match between the Nawab's team and some officers of the 30th Regiment, resulted in a victory for the former.

Selections.

THE FOOD CROPS OF MEXICO.

The great cereals of Mexico are maize or Indian corn, wheat, and barley. The extraordinary fecundity of the maize, ranging as high as four hundred to one, in spite of the lax and rude agriculture, makes it the foremost crop in our sister Republic. Its value in 1883 is given at $114,165,290; that of wheat is stated at $17,598,890; while barley (grown chiefly on the higher portions of the eastern table-lands of the Sierra Madre) is put at $4,503,770. Corn is produced in every one of the twenty-nine political divisions of the Mexican Republic, though its largest growth is found in the States of Jalisco, Guanajuato, Mexico, Oajaca, Michoacan, Puebla, Vera Cruz, San Luis Potosi, Zacatecas, Yucatan and Hidalgo, wherein the annual, value of the crop, as named, ranges from about $17,000,000 down to about $4,000,000. These eleven States are, with the exception of Vera Cruz and Yucatan, mainly included within that favored portion of the southern table-land, which, while designated as the *tierra templada* (temperate earth), yields equally of tropical and temperate products. The annual product of the States of Guerrero, Neuvo Leon, Durango, Sinaloa, Morelos, Tamaulipas, Tlascala, Chihuahua, Queretaro, Sonora, Tabasco, Coahuila, Chiapa, and probably Aguas Calientes, ranges from over $3,000,000 down a little less than a million.

Wheat grows on the plateau of Mexico at from 6,000 to 9,000 feet above sea-level, and between the eighteenth and twenty-fourth parallels of latitude. Corn grows everywhere, except on certain waste districts along the frontier, where the soil is the same as the arid plains of Arizona and New Mexico. The wheat-growing area of Mexico, *par excellence*, extends, from, say, Puebla nearly to Colima, about 500 miles east and west, and from Southern Michoacan to Southern and Central Chihuahua, about 500 miles north and south. This plateau is broken by mountain ranges into a number of rich districts specially adapted to the growing of wheat, and of this immense field of rich and arable land one-third, it is believed, could be readily put into wheat with due regard to all other agricultural interests. Under the Mexican plan of cultivation three crops are taken off the land every two years—one crop of wheat and two crops of corn. The average yield of wheat of Mexico does not now exceed 20 bushels to the acre. Corn on irrigated lands runs about 50; on dry land about 30 bushels to the acre. The mode of cultivation is similar to that of the Egyptians thousands of years ago. Wooden-beam ploughs are used, with a small iron shoe, which scratches a furrow 5 inches broad by 5 deep. Five men are used and five yoke of oxen where one would be needed in Pennsylvania. Nevertheless, the grain is of the very finest quality, and at the Centennial Exhibition, Mexico took the first prize, leading the world in wheat, as in coffee. Thrashing is done as in the olden way, on a hard floor, in the open air, and by driving mares over the wheat. The grain is winnowed by men tossing it into the air with large scoop shovels, thus imperfectly separating the chaff. The grain is then taken from the thrashing floor to the granaries or railway depot in ponderous and rudely constructed two-wheeled ox-carts, creaking at every turn. There is more cart than grain in the load pulled by the patient oxen. Already, however, there are marked changes in this primitive method, with its quaint aspects, so suggestive of oriental life and Biblical descriptions. American implements and machinery are going in rapidly, and the only danger is that the large land-owners may push the changes required too rapidly for the immediate welfare of the laborers of the country.

Rice is also an indigenous product of Mexico. But little attention has been given to its cultivation until within a year or two past. Some part of the crop is exported, and meets approval. There are large areas in the lower States where the cultivation of rice could be made profitable.

Potatoes are indigenous to Mexico, and are still found growing wild as far north as the table-land or mesas of Southern Arizona. The yield is large, but is not sufficient for the wants of the country. As to barley, it is a grain of the higher region, and grows well at a surprising altitude. Dr. Oswald, in his "Summer Land," describes Indian villages on the lofty table-lands of the west or Pacific coast, who raise barley as their grain; some wheat is also grown on them.

"Chili" (*capsicum*), the Mexican pepper, is of great importance to the Mexican cuisine, and supplying to the people that food stimulus which seems to be so necessary in warm, dry climates. Its production is as general as that of corn. Its annual production is quite large, and with the improved industrial condition accompanying and following the railroad construction, and all related movements of production and commerce, will be sure to greatly increase. The exportation is small. It is thus described by the British minister, Mr. Ward, in 1827:

"Whole estates are devoted, on the table-land, to the cultivation of this most powerful stimulant, and few are more productive, as it constitutes one of the necessaries of life with the Indian and mestizo population, and is used in very large quantities at the tables of the creoles of all ranks. Its pungency is so great that amongst the uninitiated, it produces absolute excoriation; but the palate becomes accustomed to it by degrees, and habit renders it indispensable. It is used by the lower classes as a seasoning to the insipid tortilla, and the two together furnish a meal which they would not exchange for an allowance of meat and wheaten bread."

The plough in common use in Mexico consists of two poles, one 6 feet long and the other 15 feet, fastened together by a mortise and tenon at an angle of 65°. Through and near the end of a short pole, there is a pin to steady the plough, and on its end there is attached a pointed iron or steel shoe to prevent it from readily wearing out. The yoke has no bows, but is fastened on the heads of the cattle by means of raw hide thongs, and so is the tongue of the plough to the yoke. With this rude implement the fecund soil is scratched to the surface of 3 inches. The modern and light farming tools used in this country were until very recently almost wholly unknown in Mexico. The machete (sugar-cane knife), clumsy hoes and spades, with a heavy sickle and pruning or cutting knife, constitute most of the farm tools used by the rustic "labores." Burdens are yet borne on the backs of men or women, as a rule; the barrow is a convenience still uncommon off the lines of railroad, and not common even there. The irrigation is largely regulated by manual labor. With the Mexican farmer ploughing for wheat begins in August, and lasts until he wants to stop. Wheat is sown broadcast from October 1 to January 15, and is harvested the following June. After the wheat is up, it looks as if it had been sown with a drill, owing to its having fallen into the furrow made by the plough. From one-third to one-half the wheat is lost by the primitive methods used in thrashing. The price of wheat (1883) per fanega (150 pounds) in our money was from $2·75 to $3. The first corn crop is prepared for in February and March; it is laid by in August, and gathered in December. The second crop is planted in June and July, laid by in August and September, and gathered in December and January. The reason why the second crop matures more rapidly than the preceding one is, because no irrigation is needed, the rainy season making it grow with great rapidity.

Tortillas, the common food of the country, are made by placing a quantity of maize in a jar of hot water and lime over-night. Great care is taken as to the quantity of lime to be used, as otherwise the grain will not be properly softened. In the morning, or when it is to be used, the grain is taken out of the jar and placed upon a small stone bench, at which a woman kneels, and then, with a long stone roller, reduces the grain to a kind of paste. When it has obtained the proper consistency, it is patted with the hand until it assumes the form of small pancakes, which are then slightly dried or baked on a large earthen tray or pan, over a small charcoal fire. The tortilla is made! Everybody eats them. Foreigners, especially Americans, find them detestable. Their preparation is a waste of labor and material both It is fearful drudgery to the women; and whether so considered or not in Mexico, is to all others who take note of things there as they are, the outward and visible sign of the industrial and social degradation of the mass of women. The preparation of the tortilla takes up so much of their time that no proper care is taken of the dwelling, the children, or of themselves. Some Yankee inventor, who has seen the tortilla-making process, might readily devise a small and cheap machine by which the maize-paste, so much delighted in by the Mexicans, could be furnished to whole neighbourhoods. It is hardly possible to change their habits, and induce the use of ordinary corn-meal all at once or even extensively, yet it might be done in the cities, and be made a profitable venture for some enterprising person.

THE GREEN ALOE.

It does not fall to the fortune of everyone to secure good land, even in this favoured district, either through inexperience, or reposing too much confidence in others to select for them. To meet such cases of acquisition of poor land, and also for the utilisation of what is looked upon as useless land in rich sugar estates, I have decided to devote my remarks at present to the cultivation of a plant that will grow in almost any kind of soil and anywhere; but which flourishes more luxuriantly and profitably in a tropical climate. The plant I refer to is the Aloe, or rather that species of Aloe, for there are a great variety of Aloes, of the genus Agave Fœtida or *Fourcroya Gigantea*, commonly known as the Green Aloe. In Sicily the peasants have bestowed upon this plant the title of the "Farmer's friend," from the fact of it growing where nothing else could be reared, without any attention being given to its cultivation or outlay to enrich the soil by manuring. It is also untouched by change of weather, standing equally well wet or dry, and appearing to be proof against floods, hurricanes, or diseases of any kind whatever.

"The Green Aloe has a very short stem, bearing at its summit a crowded head of large fleshy leaves which are spiny at the margin. From the midst of these shoots up the straight, upright scape 24 ft. to 36 ft. high, and at the base often 1 foot in diameter, along which are small, appressed, lanceolate bracteæ, with a terminal panicle, often bearing as many as 4,000 small bulbs. In this climate, it flowers when about seven or eight years old, but in colder countries not until a very advanced age, whence arises the gardeners' fable of it only flowering once in a century. The leaves, which grow to a length of about 8 ft. reach their full development at the fifth year, so that *four or five crops can be gathered before there is any necessity for replanting.* When starting in the cultivation of the Green Aloe a fair soil may be selected, as giving rather better results than the extremely poor, though it will grow in any land. Soil being no desideratum, ordinary clearing is all that is necessary in preparing the field. The best time to plant is during the rainy season, but this is not absolutely necessary, as generally speaking, Aloes may be planted all the year round.

"The Green Aloe can be raised either from seed or by suckers, but the best method of propagating it has been found to be from the seed. The seeds, which take the form of bulbs or onions, and are borne on tall stems previously referred to should be sown in rows 10 inches apart and 6 inches from each other. When ready for transplanting they must be planted out into fields at a depth of 3 inches to 4 inches, leaving a clear space of at least 5 feet between each plant. If it should be found desirable, from any particular circumstance, to rear from suckers, this can be accomplished, from plants one, two, or three years old.

"The commercial value of this plant is derived from its leaves, which yield a strong fibre which is used in the manufacture of rope, twine, hammocks, &c., and is generally known as Pita flax. Large quantities of it are grown in Sicily and Mauritius; in the latter country, in some instances, even canefields being turned over to its production.

"The plant yields its first crop in its fifth year, when the leaves must be gathered while green, as if allowed to grow yellow or ripen they become too woody, and the fibre loses strength thereby. To prepare it for market the fibre has to be separated from the pulp, and under the old style this was accomplished by maceration, but this process was soon abandoned from its many imperfections. Crushing the leaves by means of rollers to extract the juice and then separating the fibre from the pulp by hand was next resorted to, but this method was likewise found to be very defective on account of the rollers cutting and destroying a large quantity of fibre. The time and labour required was also a serious drawback.

"After many experiments a machine has, at length, been constructed which answers admirably the purpose for which it was invented. It consists of a wooden wheel 2 ft. in diameter, upon the surface of which are fixed 18 scratchers two inches long at a distance of two inches apart. The wheel is is fitted on two trestles and can be worked by hand, horse, or steam power. Opposite the wheel is placed a strong, narrow table upon which is fixed a piece of hard wood, covered at its head with strong leather: this is called the counter-scratcher, and is made to slide towards the wheel, being regulated by a screw which adjusts it firmly to the table at the required distance. The counter-scratcher plays an important part in the process, and requires careful manipulation, that the fibre may neither be cut nor imperfectly cleared.

"In using the machine the operator charged with the work places the leaf between the scratcher and the counter-scratcher, top foremost, and allows the pulp to be removed for about two-thirds of its length, when he turns it round and completes the operation from the other end. As soon as this operation is accomplished and the fibre freed from the pulp, it is well washed and dried in the sun, when it is ready for market. The use of iron in constructing this machine should be avoided as much as possible, the juice of the leaves being strongly impregnated with acidity, which rapidly corrodes and destroys that metal.

"The average yield from the cultivation of this plant is about a ton-and-a-half of dry fibre per acre; every 100 leaves giving about 3½ lbs. Now, as the market price in England is between £35 and £40 per ton, it does not require much calculation to arrive at the large profit there is attached to the cultivation of this plant, especially when the nature of the land upon which it can be produced is taken into consideration; the above figures representing the returns from poor land.'—*Cairns Telegraph.*

On the same subject, a writer in the *Mackay* (Queensland) *Standard*, says—

"An industry which of late has found favour in several countries is the cultivation of the aloe. The beautiful fibre made from this plant has already been turned to several accounts by the manufacturer, but where it is especially valuable is in making cordage. Captain Pender, when making deep sea soundings between Mauritius and Reunion, and Reunion and the Cape, in 1876, with the view of laying a submarine cable, mentions in his report that the line which rendered him most service was one made in Mauritius from the aloe plant. The line was stronger yet much lighter than any he had taken with him, and was in every way better suited for the work he was engaged in. The kind of aloe most appreciated is that known by botanists by the name of *Fourcroya Gigantea*, but better known at the Cape as the "Yucca," or in Jamaica as "Adam's Needle." Within the last few years serious attention has been directed to this magnificent natural product, and several factories have been started for the extraction of the fibre from the green leaves. Till lately it has grown wild in Mauritius and Reunion, but since some bundles of fibre fetched as high as £35 per ton in the London market, an impetus to aloe growing has been given, which bids fair to make it, at no distant date, one of the principal exports of many countries which possess land too rocky and arid to admit of any other cultivation. Of late, with improved machinery, and greater care bestowed in washing and drying the fibre, as much as from £45 to £48 per ton has been obtained in the home market. It is but right, however, to say that this high price has fallen of late, and that the ruling price of first class fibre is from £32 to £36 per ton. The beauty of this plant is that it grows without cultivating; that is to say, once planted it requires no looking after to clean it, &c., and it will continue to give leaves for a number of years before it requires renewal. *Drought has no effect on it, and it is of the hardest growth and grows beautifully in Mauritius and Reunion, in arid land that* has been thrown out of sugarcane cultivation on account of drought. An acre well planted gives about 1½ tons, but this will go to 2 tons later, when better machinery is used for decortication.

"In the year 1871 the value of the plant exported from Mauritius was £280, while the quantity amounted to 8 tons. In 1880, 752 tons, worth £26,320, were exported.

"A few remarks on the planting of this long neglected but useful plant may prove interesting and perhaps profitable to some. When young plants of 18 months to 2 years' growth cannot be had, the seeds are planted. The soil is turned by the stroke of a hoe, and a seed put in and covered up—nature is left to do the rest, except in cases where the young plants are prevented from growing by creepers. When these prevent the young plant from growing they are weeded out. A space of about 5 feet by 4 is left between each plant, thus giving 2,000 plants to the acre. The right time to cut the leaf is when it changes slightly its colour, and becomes a lighter green, or according to the soil a yellowish hue. In damp places this change is not apparent, and a practised eye is required to tell the proper time to cut the leaves. Plants from seed take

4 or 5 years to come to maturity, the outer leaves may, however, be cut one year earlier; but in the case of young plants of 18 months to 2 years. from 2½ to 3 years must elapse before they can be cut. The time allowed to elapse after the first cutting is generally from 9 to 12 months, according to the vigour of the plant. The outer leaves are cut off close to the stem, leaving 4 or 5 round the heart. As each plant dies, it is left to enrich the soil and the numerous small seedlings that spring up around the roots of the parent stem. The surplus seeds have not been turned to any account yet, although lately a French chemist in Paris has extracted from them an essence which he asserts is excellent in fixing colours in prints. Experiments in this line are still being made to ascertain if it cannot be made to yield something else. The green pulp scraped off the leaves is also the subject of serious investigation at the present moment, both here and elsewhere.

"Another field of industry which is open, is to manufacture this pulp into paper in the colony. This plant could easily be made to grow around hedges, and thus the most could be made of land too valuable to be exclusively planted with aloe. A decorticating machine has just been patented in Mauritius for the extraction of this fibre.'—*Paper Maker's Monthly Journal.*

TEA.

THE demand for Congous continues fairly good, and prices for all kinds remain firm. Although not quite so low as during the panic which prevailed a few weeks since, Congous generally are still much below the average of any recent year, and as supplies are ample, there is no reason to anticipate any marked improvement in values at present. Their cheapness has attracted an additional demand from the retail trade during the present month, and many of the larger dealers have bought very freely. With a continuations of low prices, which will probably ensure a large consumption, there is reason to expect a good general demand in the early part of next year. There has been some inquiry for the better grades of Black Leaf, several parcels of Oonfaah and Kiutuck having changed hands at about previous prices. A few transactions are reported in first-crop Oonfaahs at from 9*d.* to 10*d.*, and some second-crop Keemuns at similar prices have also been sold. The latter are now remarkably cheap, and are being freely used by the retail trade. Souchongs are not quite so plentiful as they were a few weeks ago, and show a decided recovery from the lowest point of the market. At the public sales of China Tea rather more than 29,000 packages were offered, without reserve; of these, 22,400 were Congous, chiefly common grades, all of which realised firm prices.

Fancy Teas show very little alteration. Canton Capers are perhaps slightly firmer, owing to the smallness of the supply. The finer kinds of Foochow Pekoes are also rather less plentiful. Few transactions have taken place in Oolongs. Green Teas have been in better demand, and prices are slightly better for most Moyune kinds.

There has been a fair supply of Indian Tea, and prices generally are steady. The cheapness of Souchongs and Pekoe Souchongs has caused an active inquiry, and large transactions have taken place. As the market will probably be well supplied with these sorts in the early part of January from the large accumulating imports of the next fortnight, a continuance of the present low prices may be expected. Should this be the case a considerably increased demand may be anticipated, as these descriptions have fallen sufficiently to bring them into favourable competition with China Congous, thereby enabling retailers to use them liberally. Broken Teas under 1*s.* are more plentiful, and have met with a good inquiry. Although these descriptions show an important decline from the highest point, still lower prices may be looked for, judging from recent reports from Calcutta of the large percentage of very common Teas sold at recent auctions. For medium broken and whole-leaf kinds, there has been a good demand, the former fetching fully previous rates, but the latter are less firm. The values of the finer qualities are, however, well maintained. Ceylon Teas have sold readily, but the inquiry for Java descriptions is very limited At the public sales, 16,005 packages of Indian, 476 Ceylon, and 812 Java Teas were offered; of these, 2,593 were withdrawn.

The arrivals for the week are:—The *Glengarry*, from Shanghai, Foochow, and Hong-Kong; *Astronomer*, *City of Edinburgh*, and *Clan Graham*, from Calcutta.

TEA SENT COASTWISE DURING THE MONTH OF NOVEMBER.

To English Ports and Inland Revenue Stations ...	lbs.	649,678
,, Scotland	,,	858,[illegible]78
,, Ireland	,,	1,272,268
Total ...	,,	2,780,824

LONDON TEA RETURNS.

	DUTY PAID.		EXPORTS.	
	1883.	1884.	1883.	1884.
For the week ended December 13 ...	lbs. 2,215,172	lbs. 2,866,738	lbs. 786,4[illegible]6	lbs. 850,630
For the 50 weeks ended December 13 ...	135,447,354	139,[illegible]85,427	39,761,920	12,948,826

—*Produce Markets' Review.*]

SUGAR INDUSTRY IN THE PAST YEAR.

THE year which has just closed has been a most disastrous one to nearly every one—except retailers and consumers—interested in sugar. In no one year in the history of the trade have the losses all round been so enormous. The price of sugar at the commencement of the year was so low, that it was the opinion of many shrewd men in the trade that the bottom had been touched. Instead of this proving to be the case, the fall in values continued steadily, month by month, with scarcely a break, all through the year, until the price of beet 88%, which in January stood at 17*s.* 6*d.*, fell to 10*s.*, a difference of 42½% in the 12 months; and this, too, in the face of an increase in the world's consumption, which is without a parallel.

The cause of this serious fall in price is obvious;—over-production, brought about by the system of bounties, adopted by Germany and some of the other beet-growing countries, on their export of sugar. As we showed in the October *Sugar Cane*, page 546, the average bounty given by the German Government for the campaign 1883-84, was 2*s.* 8*d.* per cwt., and the line of argument adopted by the Board of Trade, is, that the bounty being only 2*s.* 8*d.*, whilst the fall in value is 7*s.* 6*d.*, the difference—4*s.* 10*d.* per cwt.—is due to the natural fluctuations of the market; apparently ignoring the fact that it is this bounty of 2*s.* 8*d.* per cwt. which has led to this excessive production, and is the cause of our present troubles.

If evidence were required to prove this, we have only to turn to France. In 1868-69 the French crop amounted for these two years to 50[illegible],000 tons. In 1875-76, when the bounties were in full force, the production rose to 913,000 tons. In the year following, measures were taken by the French Government which practically removed the bounties on production; from that time the crop has shown no increase, and the production of sugar has become so unprofitable, that the Government have been forced to pass a law, under which it is anticipated that a larger bounty will, in future, be obtained by the French growers, than by those of any other country in Europe.

This ought to be a conclusive answer to those who assert, on the one hand, that the fall in the price of sugar is not due wholly to the bounties, and, on the other, that if the bounty growing countries are left alone, the loss to the revenue will become so serious that they will, before long, be compelled to abolish the system.

The natural remedy for this, is the imposition of a countervailing duty. To countervail, is "to act against with equal force or power," to equal, to balance. A countervailing duty would simply be placing sugars upon a natural basis; and this is all that our sugar colonies ask should be done. If, all being equal, it is found that they cannot compete, they will accept the situation, and turn their estates to the cultivation of something else. Reasonable as this remedy is, and quite consistent with the principles of Free Trade, still the idea that a countervailing duty is only another name for Protection, has got hold of the public mind, who associate it with the mischievous Fair Trade movement, so that no Government, either Tory or Radical, would venture to adopt it. We must therefore, dismiss from our minds this mode of meeting the evil.

This being the case, we think Mr. Baden-Powell's proposal of calling a Conference of the different beet growing countries, with a view to put an end to the present "war of bounties," as set forth in his article, "A Last Word on the Bounty Question," re-printed in our last number, is the only one likely to effect the object.

Negotiations have recently been entered into between the United States and Spain, for a reciprocity treaty for Cuba and Porto Rico. The details are to be submitted to Congress at an early date. It is said to be the most complete reciprocity treaty ever negociated by the United States Government, embracing not only the exchange of products, but also special shipping privileges for the vessels of the two nations, abolishing all tonnage and consular fees on vessels and cargoes, and making all other fees the same as for the national vessels engaged in the coasting trade. It also contains special privileges for commercial travellers, reforms in the Cuban customs regulations, concerning fines and the responsibility of vessels for errors, when fraud has not been proved, and a stipulation against the imposition of new import taxes. If this proposed treaty is carried into effect, which we think very doubtful, it means that one-half of the sugar now consumed in the States will be admitted duty free. Naturally we might conclude that this would be a boon to the consumer of sugar. Will it, however, prove so? Judging from the working of the Hawaiian Treaty, we doubt if the consumer is benefited one cent, notwithstanding the duty to be remitted would amount to something like £5,000,000. It is just the sort of "big thing" for such millionaires, as Vanderbilt, to handle and "control," and the plunder being shared in between them and the planters; they looking well to it that they secure the lion's portion. Then there is the matter of drawbacks; how is the distinction to be made between those sugars which have paid duty, and those admitted duty free? Would not this open a very wide door for frauds on an extensive scale?

What would permanently benefit the West Indies would be, a reduction of the duties, say to one-half, if the time has not arrived for their entire abolition. This would lead to a still further increase in the consumption in the States, and, as a consequence, in time, to a decided improvement in prices.

The severe crisis through which our West India colonies are passing, has led to a considerable correspondence in our daily and other papers, as to its causes, and the remedies to be applied. Our planters have been twitted for their want of skill and energy in the cultivation of the cane, and in the manufacture of their sugar, and in this respect showing the striking contrast between them and their German rivals. We are far from saying that our planters have made the most of their opportunities, but in instituting contrasts, to be fair, every circumstance should be brought into the reckoning. Their German rivals have given them the most powerful incentive to put forth their utmost energies, for every decimal percentage of sugar obtained beyond the legal yield, is a clear gain to them, to the extent of the duty. Our own planters have no such incentive, but, on the other hand, have been struggling on, handicapped by these bounties.

The British Refiners' Committee have been, during the year, in frequent correspondence with the Board of Trade and the Foreign Office on the question of Foreign bounties, more especially those of Holland and the United States. Mr. Duncan, as chairman of the committee, in his letter to Mr. Giffen, of 29th April, referring to Holland, concludes as follows:—"And now that my statements have been fully verified, in every respect, I cannot refrain from expressing my regret that the accuracy of my statements was disputed, and my warning disregarded, more especially as the competition of Dutch loaf sugar, at prices below the cost of production, has continued to increase, and has been most harassing to producers in this country."

The Refiners' Committee also pointed out to our Government, and, through it, to the authorities at Washington, that if the provisional arrangements in respect to drawbacks, under the New Tariff, became established, the American refiners would get a bounty on exportation of 2s. per cwt. Unfortunately for the refining interest of this country, these representations were unheeded; the consequence has been that during the first 11 months of 1884, more than 50,000 tons of refined sugar have been exported to this country, upon which the American refiner has received a bounty of upwards of £100,000—that is to say, the American Government have paid back, in the shape of drawbacks, £100,000 more than they have received in duties upon the sugars so shipped

Mr Giffen, in his summary of the report to the Board of Trade, points out, in order to show that the refining trade of this country cannot be an unprofitable one, that the present production of refined is as great as ever it was. It is well known that the cotton trade of Lancashire at the present time, is in a bad way, and yet the quantity of yarn and cloth now being turned out shows no diminution. Are we to infer from this that there is no real foundation for the complaints which we hear on all sides? The cotton spinner like the refiner, has heavy standing expenses which have to be met, whether the place is standing or working; and the question has sometimes to be decided, which is the less loss—to work, or to stand? Mr. Giffen would have the public to infer that because our refiners do not, one after another, close their works, that there is no ground for their grievance.

In entering upon a new year it is very natural for the mind to speculate upon the probable course of events. As regards sugar, at the present time, this is almost impossible to do as for a captain, when leaving Sandy Hook, to tell when his ship will arrive in Liverpool. At the same time, there are indications which may fairly furnish good ground for a more hopeful feeling. At a recent meeting at Halle, of German beet-growers and fabricants, it was unanimously decided to reduce the production by 20 per cent, as the only way by which such an improvement in prices could be brought about as would enable the fabricant to give to the beet grower a price that would pay him to go on cultivating. If this is done, it means a reduction, in the next campaign, in the German production of sugar of 200,000 tons, and if we take into consideration the increase that is going on in the consumption, a decided advance in value may fairly be looked for. One thing is very certain, that sugar cannot be grown and delivered in this market at anything like 10s. per cwt. It cannot be done in Germany, even with the bounty of 2s. 8*d.* per cwt., much less in our own colonies, with no bounties to help them out.

SUGAR.

The raising of the previous estimates of the German Beet crop by 50,000 tons, though partly balanced by a reduction of 25,000 tons in the French crop, has increased the depression of the Raw market, and Beet has again declined in price. On the other hand, the total landings of all Sugars for the week ending 13th instant showed the large falling-off of 10,000 tons, by which the surplus in the stock at the four ports was produced to 26,000 tons; but this will be largely increased if the German fabricants find that it is hopeless to look for any permanent improvement in prices. At present they seem to prefer to warehouse their sugar, as the exports so far this season only show quite a small increase, notwithstanding the far larger crop. The general stock here will also be considerably enlarged by an expected increase of supplies from Java, which will probably more than balance any falling-off in shipments of refining sugars from the West Indies. The Cane crops generally promise an unusually heavy yield. Only a small business has been done in the refining kinds here this week, but low brown Eastern Sugars have met with a fair inquiry. Crystallised Demerara has been freely offered, and as the present low prices have induced the trade to buy more freely, Yellow Sugars are fairly steady, but the paler sorts are somewhat cheaper. The quantity of crystallized raw sugar imported to London in the week ending 17th instant was 3,323 tons.

The demand from the trade for Centrifugals has been very small, but as the refiners have somewhat reduced their out-turn, Mediums are 3*d.* dearer. Other kinds are unchanged, except for the lowest Yellows, which are rather cheaper. The supply in the market will be further reduced during the next week or ten days, but it is to be hoped that after the holidays are over, business will not be checked by any limitation of work on the part of the refiners. Any effort to raise prices by artificial means would, even if temporarily successful, only be followed by a heavier drop later on, in the present condition of the sugar market. Besides, a condition of the kind appears recently to have broken down on the Clyde, as the temptation of the existing margin was too great for the refiners there. Greenock is, in consequence, again heavily underselling London, and if our refiners combine to raise prices, they will simply drive the trade elsewhere. This would be the more regrettable as, if prices continue moderate, there is a prospect of a better demand from the grocers, who no doubt have lately been working with very small stocks. On the other hand, with the existing weakness in Beet root, were the prices of refiners to be forced up to any extent, a reaction would inevitably follow. Our refiners would again miss the chance of doing a good trade, they would have raised the price of Beet upon themselves, and would be forced to buy, at a higher price, sugar which, by the time it was made, would have to be forced off in a rapidly falling market. Surely after the experience of the past the recurrence of such a state of things is to be avoided by refiners and dealers alike. As regards the lower Centrifugals also, it is well to bear in mind that Demeraras of far superior quality can now be retailed profitably at 2*d.* per lb. English Titlers and Dutch Loaves are again 3*d.* cheaper, and contracts for delivery up to next March have been made for the latter at the present low rates. Cut sugars are unchanged, and are selling slowly.

The following Greenock market report is dated December 18th:—"We have had a rather dull week, buyers shy, and disposed to hold off unless at a decline. The amount of business done has been much less than in any very recent week, and prices have tended distinctly against sellers, showing a rather irregular 6*d.* to 1*s.* since Thursday last. Supplies are larger. Deliveries scarcely satisfactory in view of increased quantities on offer." The following Greenock telegram reports Friday's market:—"Good business done at easy prices."

It is curious to notice that the imports of sugar from Europe into the United States amounted, from the 1st January to the 4th December this year, to 70,000 tons, and that the exports of refined sugar from that country, chiefly to United Kingdom, reached 58,195 tons in the same year. This apparently absurd journeying backward of sugar over the Atlantic, is effected at the cost of the tax-payers of the United States, who, in addition to limiting their consumption by import duties, grant heavy export bounties of certainly £2 per ton to their refiners. The latter, in consequence, are in a position to buy sugar in Europe, bring it over thousands of miles of sea, and then send it back again the same distance, and yet under-sell the British refiners in this market. In short, our Yankee cousins pay some £100,000 a year in unnecessary sugar duties, in order that we may have fractionally cheaper sugar. This may be an excellent system for the New York and Boston refiner, but the cuteness of the tax-payers in the transaction is by no means obvious. No doubt, as a matter of fact, they are ignorant of the whole affair. A round-robin, signed by our refiners, explaining the case, and inserted in all the trade and leading political journals of the State, would probably upset the system. Even as an advertisement it would doubtless attract much attention. According to the reports in our newspapers, the treaty admitting Spanish Colonial sugar free into the States is likely to be rejected by the Washington Senate. No fresh news has been published as to the progress of the Sugars of our West Indian Colonies.

The following return of the exports of sugar from Germany in the first eleven months of the year, shows that the low prices and the great difference between the market value of Raw and White Sugars, coupled with the far heavier drawbacks on the latter, are causes tending to make the manufacturers produce sugar fit for consumption without refining:—

EXPORTS FROM GERMANY FROM JANUARY 1 TO NOVEMBER 30.

	WHITE SUGARS.		YELLOW SUGARS.
	Drawback per centner of 110 Eng. lbs. 11 marks 10 pf.	Drawback per centner of 110 Eng. lbs. 10 marks 40 pf.	Drawback per centner of 110 Eng. lbs. 9 marks.
	Tons.	Tons.	Tons.
1884 ...	74,532	25,344	422,355
1883 ...	47,610	20,353	349,593
Increase 1884	26,922	4,991	72,762

GENERAL SUPPLIES OF RAW SUGAR IN STOCK AND AFLOAT.

	1884.	1883.	1882.
	Tons.	Tons.	Tons.
Great Britain, December 13 ...	243,289	217,945	212,667
France, November 1 ...	161,853	107,626	96,027
Germany, November 1 ...	118,050	96,325	56,250
Belgium, November 1 ...	34,790	4,820	8,347
Holland, December 1 ...	19,678	17,160	13,853
Afloat, December 14 ..	40,893	55,567	43,207
Total for Europe, tons ...	618,553	409,443	425,351
United States, December 2 ...	95,895	53,615	50,596
Havana & Matanzas, November 21	31,978	21,[illegible]56	34,137
Total tons... ...	746,420	574,814	510,084

—*Produce Markets' Review.*]

FAIRY ROSES.

THESE have always been popular as room plants, and also among amateurs whose means for plant-growing may be described as limited, consisting only, perhaps, of a small greenhouse and frame or so. Latterly there have been some valuable additions made to the list of varieties. Not many years ago we could only obtain the old-fashioned crimson and pink varieties, known fully as well to our grandmothers as to ourselves. Now we have several beautiful pure white sorts, and a crimson far surpassing in brilliancy the old-fashioned one just alluded to. These newer varieties are not called Fairy Roses, but Polyantha Roses, an innovation which we do not approve of, on the ground that it is not so popular and homely. We would rather have the old name, if even there is nothing in it. These Fairy Roses ought to become very popular when they become better known. They are neat in habit, and have beautiful foliage and flowers, the latter produced in such profusion as only Fairy Roses can produce, above all they are so easily cultivated that they may be grown successfully by the merest tyro in the art of plant-growing. They are very easily propagated, to begin at the beginning, by means of cuttings. The tops of shoots three or four inches in length will make excellent cuttings. These should be placed in sandy soil in pots in the months of May or June, keeping them close in a cold frame, and shaded from the sun, but otherwise well exposed to light, till they are rooted. When they have formed roots let them be potted into 3½ or 4 inch pots, and still be kept close till they have established themselves by making some roots. • After this they should be more freely exposed to light and air, and be encouraged to make growth freely. As soon as the plants have filled their first pots with roots they should be shifted into larger pots; and the shoots should be stopped occasionally during the early part of the summer to induce business and compactness of habit. They should each have a stake placed close to the leading stem, which must be tied to it, so that the plant may be kept in good symmetry, somewhat pyramidal in form. Grown in this manner they will make nice, compact flowering plants, clothed at every tip with flower buds, which will last for many weeks during the spring and early summer following the period of propagation. Two-year-old plants may be treated during the growing period precisely as young plants after they are established in their first pots. The principal enemy they have is green fly, which, however, can easily be kept in check by means of a decoction of quassia and tobacco water, or soft soap, the latter being more cleanly as an ingredient in the wash than tobacco water. Mildew also is liable to make its appearance if the atmosphere is not kept well ventilated and healthy, but is easily dealt with by means of sulphur and soft soap in solution. Preventive measures are better than cures, and by frequently making use of the means indicated, neither pest will make its appearance at any time. The following are the best sorts:—Gloire, crimson; Pompon bijou, dark rose; Pumila alba, white.

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

THE disease commences with a slight derangement of the stomach, but, if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions he will be able to determine whether he himself is one of the afflicted:—Have 1 distress, pain, or difficulty in breathing after eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does a thick sticky mucous gather about the gums and teeth in the mornings accompanied by a disagreeable taste? Is the tongue coated? Are there pains in the sides and back? Is there a fullness about the right side as if the liver were enlarging? Is there costiveness? Is there vertigo or dizziness when rising suddenly from a horizontal position? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach? Is there frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one of long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantity of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market-Place, Pocklington, York, Oct. 2, 1882.

Sir,—Being a sufferer for years with dyspepsia in all its worst forms, and after spending pounds in medicines, I was at last persuaded to try Mother Seigel's Curative Syrup, and am thankful to say have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same complaint to give it a trial; the results they would soon find out for themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. TURNER.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

St. Mary-street, Peterborough, Nov. 29, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,

Mr. A. J. WHITE. WILLIAM BRENT.

"Hensingham, Whitehaven, Oct. 16, 1882.

"Mr. A. J. WHITE.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) JOHN H. LIGHTFOOT.

August 15th, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.—Yours truly,

(Signed) N. WEBB,

Mr. WHITE. Chemist, Calne.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer describes it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Signed) VINCENT A. WILLS,

Chemist-Dentist,

To Mr. A. J. WHITE. Merthyr Tydvil.

Preston, Sept. 21st, 1883.

My Dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully; in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great—I am, dear Sir, yours faithfully,

(Signed) W. BOWKER.

To A. J. WHITE, Esq. (A)

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THE
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A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, FEBRUARY 7, 1885. [No. 6.

Crop and Weather Report.

[FOR THE WEEK ENDING THE 28TH JANUARY 1885.]

General Remarks.—There has been some rain in parts of Sindh, and in places in the Central Provinces, in the Central India States, and in Bengal. Rain has also fallen in most districts of the North-Western Provinces and Oudh, and in many places in the Punjab.

In Madras prospects continue to be unfavourable in parts of Bellary and Anantapore; elsewhere standing crops are generally in good condition. In Mysore the crops are in fair condition, except in the Kolar and Toomkoor districts, where prospects are not encouraging. The rice harvest has been completed in Coorg, and threshing has commenced. Coffee-picking still continues on European estates, but there is no demand in the local market for native produce.

Rabi prospects continue good in Bombay. In parts of Hyderabad and on the Upper Sindh Frontier, the standing crops have been injured by frosts. Scarcity of fodder continues in several talukas of Dharwar, Belgaum, and Kaladgi, and of drinking water in parts of Dharwar and Belgaum.

In the Berars, the Central India, and Rajpootana States, prospects are generally very favourable.

The *rabi* crops are flourishing in the Central Provinces and in the Punjab, and are generally in good condition in the North-Western Provinces and Oudh.

In Bengal, mustard, *mug*, and *kalai* are being gathered, and harvesting of paddy is finished, except on very low lands. The outturn generally has been below the average. Lands are being prepared for *boro* paddy and *aus* crops. More rain is required for the *rabi* crops.

In Assam the *sali dhan* has been nearly harvested, and lands are being prepared for the winter crops. The rice harvest has been gathered in the majority of districts in British Burmah, and threshing is in progress.

The mortality from cholera has again increased in Coimbatore and Tanjore. In other provinces the public health is generally good.

Prices generally are stationary, except in the Punjab where they are fluctuating.

Madras.—General prospects fair, except in parts of Bellary and Anantapore.

Bombay.—Rain in parts of Sindh; *rabi* prospects unchanged; standing crops slightly injured by frost in parts of Hyderabad and Upper Sindh Frontier, and by rats in one taluka of Nasik; scarcity of fodder continues in several talukas of Dharwar, Belgaum, and Kaladgi, and of drinking water in parts of Dharwar and Belgaum; cholera in parts of four districts; cattle-disease in parts of eight, and fever and smallpox in parts of twelve districts.

Bengal.—Rain fell in some districts; more rain is still wanted for later *rabi* crops; mustard, *mug*, and *kalai* are being gathered; harvesting of paddy, except that on very low lands, is finished, with an outturn generally below the average; lands are being prepared for *boro* paddy and *aus* crops; price of common rice is generally stationary; public health on the whole is good, though some cases of small-pox and cholera are still reported.

N.-W. P. & Oudh.—Weather cold; light rain fell during the week in most districts; some injury to crops by hail and blight in a few places, but generally the prospects both of food and poppy crops are favourable; supplies are sufficient and prices easy; the health of the people and condition of cattle continue satisfactory.

Punjab.—Fever disappeared from Umballa district; health of rest of the province good; crop prospects generally good; prices rising in Lahore and Rawal Pindi, and falling in other districts.

Central Provinces.—Weather getting warm, cloudy at times; prospects continue favourable; health generally good; prices steady.

British Burmah.—Harvest gathered in majority of districts and threshing general; cholera prevalent in town of Prome and small-pox in towns of Thayetmayo, Henzada, and Mergui; elsewhere both diseases sporadic only; cattle-disease prevalent in one township of Bassein district, elsewhere very trifling.

Assam.—Weather seasonable; prospects of winter crops good; health good.

Mysore and Coorg.—Crops, health, and prospects generally favourable.

Berar and Hyderabad.—Weather clear and cool; cotton-picking continues; *rabi* prospects good; general health good.

Central India States.—Prospects good; weather clear and cold; health good.

Rajpootana.—Weather changeable, with occasional storm; health and prospects good.

Editorial Notes.

ACCORDING to a contemporary not only colonial wine-growers, but tropical planters who have been long struggling hopelessly with leaf disease in coffee, cankering cinchona, and other more or less mysterious enemies of vegetable life, will be interested to learn that a medical man in the department of Maine et Loire, France, is reported to have discovered a means of overcoming the phylloxera by an easy and inexpensive treatment, the basis of which is an arsenical solution mixed with cinders. The limited experiments made with this preparation seem to have been attended with admirable results. A vineyard selected from a neighbourhood completely devastated by the phylloxera, and subjected to the new treatment, resisted the scourge in a most striking manner. Not only the foliage and stocks, but the roots remained perfectly intact, while the fruit is said to have been abundant and of excellent quality. Further experiments on a large scale are about to be made in the Medoc; and the inventor having patented his remedy, the result obtained will receive all possible publicity. The outcome of these experiments, which are being conducted under the patronage of M. Lalande, President of the Bordeaux Chamber of Commence, is awaited with the greatest impatience.

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ANY one who has had occasion to travel by water in any Indian province, must have noticed huge pieces of timber lying along the banks of rivers partially immersed in water. This is the method generally practised in this country for seasoning wood. Now as our readers are aware that trees, immediately after they have been felled, contain a large quantity of moisture unless they have been previously killed, and are therefore unfit for use, until they undergo the process called seasoning. This means the evaporation of water which if permitted to remain in the body of the tree would ferment, and decay would be the result. On the other hand, if it be dried too rapidly, the gum and other matter in the wood would, in course of evaporation, disappear, instead of gradually assimilating with the fibres, and tending to bind them together, as in the case when the drying process is conducted with proper care. *This renders the wood brittle, and therefore depreciated* in strength. Now in regard to the method adopted in India, people are apt to think that immersing timber in running stream for a time, before stacking, helps to season it, and therefore is less liable to decay. In the first place this is not always possible; but even if it were, there are great drawbacks attending this process. It should be observed here that the timber being partially submerged under water, the action of the sun's rays acting on the portion exposed to the atmosphere causes cracks, and thus interferes with the soundness of the wood, while more matter is carried off than is necessary. To avoid this some people leave the timber in the bulk for a time before converting it into planks. This is also objectionable, for if there are any cracks through the bark to allow of moisture lodging in it, decay is sure to set in. A correspondent of an American paper writing on the subject says, that the best way is to cut the timber into planks at once, after felling, and place it in a store room or shed with good ventilation, but no violent draught or air and no moisture. The floor should be perfectly dry and the roof lofty.

⁂

In stacking the timber, it is well, when convenient, to stand the planks on end, the root end upwards, and well raised from the ground. In all cases each plank or board should be separated from the next one by laths, to allow the air freely to circulate between them. After being in this position for four or five months, it is well to reverse them, and brush off with a hard brush any moisture or mildew that may appear. Timber seasoned in this manner proves the toughest and most durable. In seasoning, hard wood takes about one year to the inch, and soft wood much less. Where it is possible it is well to cut all timber into scantlings, and in panels or boards; to plane them some time before being used, as they are apt to shrink, no matter how long they are seasoning, for the wood which requires least seasoning is generally found to be the most durable; it then becomes an essential point that trees should be felled during the winter months, that being the season when the tree has least sap or vegetation within it. With regard to knots, it is easy to avoid them, as, generally speaking, the trunk shows in most cases the signs of the knots outside; but with shakes it is not so, for the trunk may appear perfectly sound and healthy, and even when cut into planks may appear sound, yet, when beginning to season, shakes may possibly show. The three principal kinds of shake are heart-shake, star-shake, and cup-shake; heart-shake is found in nearly all descriptions of timber, but in so small a quantity that it is of no consequence, while in others it causes the loss of nearly the entire tree. As a general rule it is not so wasteful as the star-shake and cup-shake, unless where it takes a twisting form. But in all cases it is only when timber is seasoned that the full extent of the injury is seen. In case of rot or decay it is not so much so, because it shows in the log, and with proper care in seasoning, decay can be prevented spreading.

⁂

The expenditure on arboriculture in the Central Provinces during the year 1883-84 was Rs. 19,135, against Rs. 18,150 in the previous year. Of the former sum, Rs. 15,585 was provided from local funds, and Rs. 3,550 was expended by the Public Works Department in maintaining avenues and groves on the roads under their charge. Most trees were planted out in the Hoshungabad district. No planting operations were undertaken in the Nagpore, Chanda, Seoni, Mundla, Betul, and Raipore districts. Private individuals are reported to have planted out 9,434 trees in avenues, and 1,982 in groves, upwards of half of which were planted in the Hoshungabad district, and the next largest number in Nimar. In the returns from some of the districts, however, it appears that the number of trees planted from public funds and by private individuals have been mixed up together, so that it is impossible to arrive at the exact expenditure.

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The report on the Customs administration of the port of Bombay for the year 1883-84 has just been published. The nett revenue collected by the department during the year shows an increase of Rs. 1,87,964-5-10 over that of the previous year. In import duties, there was an increase of Rs. 59,446. To this sum Rs. 16,232 were contributed by increased importations of arms, ammunition, and military stores, and Rs. 49,046 by liquors. Calcutta having deprived Bombay of a large portion of the trade in Indian rice to African and Persian Gulf ports, there was a decrease amounting to Rs. 10,874 in the export duty. While the refunds during the previous year amounted only to Rs. 4,010, during the year under review they increased to Rs. 8,191. There was a large decrease of Rs. 1,42,600 in the amount of drawback paid during the year. The actual expenditure on account of establishments and charges connected with the Custom House proper amounted to Rs. 2,14,811, being less by Rs. 52,366 than the amount expended in the previous year. The financial results of the reductions of establishment effected in consequence of the abolition of a great number of import duties, are shown for a complete year for the first time. The saving comes to Rs. 1,95,600, or very nearly two lakhs, the amount indicated in the Government of India Resolution on the subject. The bulk of the foreign trade was about the same as in the previous year, but the coasting trade was brisker. Mr. Pritchard remarks that the reduced establishment was able to cope successfully with the increased work devolving upon it.

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Attention is being given in the Punjab to the large quantity of box-wood which is to be found in various parts of the province. It is estimated that the total area known at present to be covered with box-wood is 1,300 acres. Only a part of this area contains pure box forest; in other parts the tree is found mixed up with other faster-growing trees, in consequence of which it becomes stunted. It is calculated that there are at present 7,777 mature trees, above two feet in girth; and the growing stock is estimated at about 17,500 trees. Prices vary from Rs. 102 at Jhelum, to Rs. 196 per ton, at Umritsur and Simla; while in London, box-wood fetches £24 per ton. Including carriage to the port of shipment, it is estimated that the cost would be equivalent to £18 8*s.* 8*d.* per ton, which would give a much better profit than if the wood were sold in the local markets. It is not considered possible to secure at present an annually recurring out-turn, owing to the difficulties of working, but it is proposed to make four cuttings, one in 1884-85, another in 1891-92, another in 1899-1900, and a fourth in 1906-07. In the meantime experiments with regard to the reproduction of the tree have been instituted in all the forest divisions where it flourishes, and orders have been given for the strict protection of box-wood forests.

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From statistics recently published, we find that the five principal coal-producing countries of the world are Great Britain, the United States, Germany, France, and Belgium. The mines of Spain and Russia yield a certain quantity of coal, and it is also worked to some extent in several of the dependencies of Great Britain, such as Nova Scotia and New South Wales, but practically speaking, the world's coal is drawn from the five countries named above. Now let us examine the course which production is taking in each of them. In Great Britain, 158,850,000 tons of coal, in round numbers, were raised in 1882, and 166,200,000 tons in the succeeding year. The production of the United States is also progressing, having risen in 1883 to 95,800,000 tons, as compared with 93,600,000 tons in 1882. Germany, again, produced 70,250,000 tons in 1883 as compared with 65,370,000 tons in the previous year. The production of coal in France in 1883 was 21,446,000 tons, while the corresponding production of 1882 was 20,603,000. In 1883 Belgium yielded 18,135,000 tons, and in 1882, 17,590,000 tons. Altogether the five countries produced between them 371,631,000 tons, of coal in 1883, as compared with 356,010,000 tons in 1882. It will thus be seen that Great Britain has fully maintained her pre-eminence in the matter of producing coal, and her extraction is growing more rapidly than in any of the other coal-yielding countries. Considering that nearly 45 per cent of the world's coal is raised in Great Britain alone, it is a truly marvellous result, when we come to examine the limited area of England, Scotland, and Wales. It is, moreover, an astonishing illustration also of what can be effected by labor and capital intelligently directed, even when the natural resources upon which they are brought to bear are less considerable than those existing in more extensive and more highly favoured regions. In the matter of the rapid increase of production, Germany ranks next. In France the progress is very slow, indeed, as will be seen from the following figures. In 1863 she raised 10,576,000 tons, while ten years later, that is, in 1873, the production was not carried beyond 17,886,000 tons, rising languidly in 1883 to 21,446,000 tons. The fact that while Great Britain has been increasing her coal production progressively at the rate of 7 or 8 million tons per annum, and in France, during the last twenty years, the corresponding average progress has only been 500,000 tons, we are irresistibly led to the conclusion that the French have failed to put sufficient energy and vigor into their coal-mining. We have shown above that the aggregate production of coal in 1883 in Great

Britain, the United States, Germany, France and Belgium, was 371,000,000 tons in round figures. In 1882, the corresponding production was 356,000,000 tons ; in 1881, 332,200,000 tons ; in 1880, 315,100,000 tons ; and in 1879, 285,600,000 tons. We thus arrive at the astonishing fact that the production of coal in the five countries increased in the four years ending with 1883, inclusive, to the extent of 85,400,000 tons.

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A CONTEMPORARY alluding to the subject says :—"We hear of the continued dullness of trade and the discouraging results of commercial enterprise, but in presence of the stupendous increase indicated in the production of coal by the figures which we have just cited, it cannot, we think, be fairly maintained that the coal-mining industry has been depressed during the past half decade. This remark holds good, at any rate, so far as the extraction is concerned, and the only question is whether the prices obtained have been fairly remunerative. Probably coal owners have suffered from the growth of competition, which has been a distinctive feature in all trades and pursuits during the last five or ten years. The main cause of the continual growth observable in the coal extraction of the five countries is, no doubt, the steady development of steam power and the increased domestic consumption resulting from the progress of population. The demand for household coal must have a tendency to grow as households are multiplied ; but after all, the main explanation of the continual expansion of the world's coal trade must be found in the steady development of the world's steam power. Every day more and more steam engines are brought into operation, more and more railways are established, and more and more steamers are built. Hence it comes about that more and more coal must be raised to feed the steam boilers of the world."

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WE have been favoured with a printed copy of minutes of meetings held by the managing committee of the Bijnour Agricultural Society, held during the latter part of 1884. A prominent feature of the managing committee deserves to be noticed here, *viz.*, that with the exception of Mr. A. M. Markham, C.S., President, it is composed entirely of native gentlemen of distinguished abilities and position. We earnestly hope the example will be more widely followed in other parts of the country. The Secretary, Pundit Sri Lal, reports the death from cattle-disease of the Cawnpore bull, which was the property of the Agricultural Department, but was provided to the Society on an annual hire of Rs. 16. He also submitted the Director of Agriculture and Commerce's letter addressed to the Collector of Bijnour on the subject of purchase of bulls from the Hissar Farm. The purchase of these bulls being very high, it was resolved to get as a substitute one from Kanwarya. An additional contribution of Rs. 150 was made to the Moule Garden Fund. The income during the year was estimated at Rs. 2,891, and the expenditure at Rs. 2,812, leaving a balance of Rs. 79 only. A letter from the Director of Agriculture and Commerce to the address of the Collector of Bijnour on the subject of the Secretary Pundit Sri Lal's proposed visit to England, was considered, and it was resolved that the Collector be informed that the Society accepts with gratitude the offer of Government and its own responsibility for one-half of any further expenditure, which may be found necessary in connection with the Pundit's visit to England. As, however, of his private subscription of Rs. 600, Rs 300 was at once required by him to pay for his passage home, the committee trust that a deposit of Rs. 3,000 will be considered sufficient by the Government, and this sum they were prepared to deposit at once in the treasury. The entire cost of the trip, including board and lodging at Cirencester, during the seven terms, and elsewhere during college vacation, with all incidental charges, was estimated in round numbers at Rs. 8,600. Of this sum half were to be provided by the Society, and the other half by the Government. To the honor of a local celebrity, Raja Juggut Sunker Bahadoor, be it said, that he subscribed the sum of Rs. 2,000 towards this laudable object. The following seeds were distributed among the members of the Society for experiments during the *kharif* season :—New Orleans cotton, Nankin cotton, sorgho amber, black sorghum, Jaunpore maize, American maize, Guinea grass. We are glad to learn that the Society's *Agricultural Journal*, published since March last, has met with a favourable reception at the hands of landholders and others interested in agricultural improvements. There are now 800 names on the list of subscribers against 600 in March 1883, when the first number was issued.

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THE *Journal of the Society of Arts* draws attention to a report by Mr. Consul Griffin, of Auckland, on the Tamkatra bark (*Phyllocladus trichomanoides*), which he says has been exported to Europe of late years in very large quantities, in consequence of its being so highly prized for dyeing and tanning, "recent tests having established the fact that it is one of the best vegetable dyes in the world, and especially for yellow, pink, and fawn colours." An interesting fact connected with the tree is said to be that it produces a most beautiful walking-stick. The bushmen bruise the bark of the sapling at regular intervals, and after a few days, cut the sapling down and peel off the bark. The stick then presents a mottled surface, and of a permanent bright red and white colour. In obtaining the bark for exportation a transverse incision is made with a knife round the trunk at the bottom, and a similar cut just below the junction of the branches ; vertical incisions are then made with a very sharp knife, and the bark removed in long narrow strips, and all the branches large enough to contain bark of any value are stripped in the same manner. The tree, if not too large, is generally cut down, and the bark is thus removed more easily, it being useless to endeavour to save the tree, as removing the bark invariably kills it. The barking usually takes place in the winter, though it is said that it would be preferable to collect it in the spring, at which season the tannin is most abundant. The bark, when peeled, is put up in bundles from 4 to 5 feet in length, and is then ready for shipment, usually to London, whence it finds its way to Grenoble, where it is largely used for dyeing kid gloves. It is only of late years that Tamkatra bark has been exported from New Zealand, and owing to its valuable properties, it is expected that the trade in this article will largely increase. In 1873 the amount exported was 24 tons, while during the first six months of 1883—the latest date for which returns are available—it exceeded 575 tons, with a value of £4,000.

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THE wine productions of France for the year 1884 is given in the official statistics just issued at 34,780,726 hectolitres. This is more than a million less than that of 1883, but four millions more than that of 1882, and about three and-a-half millions more than the average of the last five years. The result may therefore be pronounced satisfactory, the more so as the quality of the wine is above the average. The wine-planted area is, however, constantly lessening, in consequence of the ravages of the phylloxera. In 1874 there were 2,446,000 hectares of vineyards, but at the present time these do not cover more than 2,040,759 hectares. Last year alone the reduction, notwithstanding fresh plantings, was 55,000 hectares. To meet the deficiencies of the home production, there has been an increased manufacture of artificial wines, and also increased importations. As much as 2,885,000 hectolitres were last year produced by the addition of sugared water and by the fermentation of raisins. Up to the end of November the importations amounted to 7,219,000 hectolitres. One satisfactory feature is afforded by the increased cultivation in Algeria, from which 896,291 hectolitres were last year obtained.

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THE second report on the prospects of the cotton crop in the Bombay Presidency is as follows :—Complete cotton reports not received. Kaladgi crop has withered, estimated outturn 1 to 3 annas. Dharwar, crop middling, exotic cotton in places blighted, outturn 8 annas. Belgaum, crop middling, outturn 7 annas. Ahmednugger, crop has in most places withered, outturn 2 to 6 annas. Sholapore, crop entirely failed. In Nasik, crop much injured by heavy rain in December, outturn 4 to 10 annas. Satara, outturn 14 annas. In Surat, December rain has slightly injured the crop, outturn 12 annas. Broach, crop in places damaged by blight and cloudy weather, outturn 9 annas. Ahmedabad, crop middling, outturn 9 annas. In Sindh condition

In places good, in others bad and fair. Kathiawar, crop tolerably good. Kolhapore, crop middling. The prospects of the cotton crop in the Bombay Presidency are unsatisfactory. In Kaladgi the crop has almost failed, and the yield of the other important cotton-growing districts is estimated at about 9 annas.

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At the last Smithfield Club Show, was exhibited the first large display of ensilage yet seen in Europe. Mr. H. Kains-Jackson, referring to this exhibition, says :—" The entries, 330 in number, are the largest percentage of exhibitors—in proportion to the total number of silo proprietors—that has ever been made at any English or foreign agricultural show. They represent ensilage from diverse substances, made from all parts of the kingdom. For making the awards, five judges have made a close examination of the specimens. These specimens were received in sample boxes two feet in length, so that when sawn asunder a clear sample of a cubic foot might be untouched, whilst the dual specimen could be pulled to pieces and otherwise be examined. The champion award was made by Mr. Henry Woods, agent to Lord Walsingham, of large experience and practice in making ensilage, and myself, from the six prize samples selected by the judges." The prize samples are exhibited on the stand of Messrs. James Carter and Co., seed farmers and merchants, No. 66, in the North Gallery. The following is a list of those exhibitors who have obtained first prizes in the various classes :—Champion Prize—A silver cup, or purse of ten sovereigns. No. 125 in class 2, Mr. John Swan, Lincoln ; 215, Mr. William Oliver Howpasley, Howick ; 25, Mr. A M. Cardwell, Valley House, Horsted, Keynes ; 224, the executors of the late Mr. F. Eagle, Hall Farm, Brightlingsea, Essex ; 122, Mr. A. H. Grant, Abbotswold Manor, Romsey, Hants ; 45, Mr. Thomas Powell, East Lenham, Maidstone ; 125, Mr. John Swan, Stonefield, Lincoln ; 201, Viscount Gage, Firle, Lewes ; 219, Mr. W. E. Oakley, the Home Farm, Tan-y-Bwlch, Merionethshire ; 299, Mr. Edwin Brett, White Knobs Farm, Caterham Valley ; 294, the representatives of the late Marquis of Londonderry.

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The report of the Directors of the *Devala-Moyar* Company shows that the mining works are not altogether without hope. From 225 tons of quartz, 25 ozs. 12 grains of gold have been obtained, which is equivalent to 2 dwts. 5 grains. Such a return would of course never pay expenses. Its chief importance lies in the fact that the reef continues to be auriferous. At times the prospect is reported to have given as much as one ounce to the ton. Mr. Gitchell still thinks that something better may be found under the mountain. The agricultural prospects are good. The report of the Directors of the Indian Consolidated Company states that since June complete statistics have been furnished of five milling results. The richest quartz treated contained by average of assay 3 dwts. 20 grains to the ton, and the milling results have been 74 to 76 per cent of the assay values. The Directors add :—" If quartz were obtainable sufficient to keep the 20-head mill at work, which would yield from four to five pennyweights of gold per ton, its value would probably defray the expenses of the undertaking. The reef, as far as it has been explored, is generally wide, well defined, and persistent in its course, and may yet be found to enclose remunerative shoots of quartz." A good deal of attention has been paid to planting, but the cash produce from this is a matter somewhat in the future. The Directors are trying to acquire a property in the Mysore district, about which they speak somewhat darkly in their report.

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The following account of the opening of a silo given by a contemporary will be read with interest :—"On Monday morning a goodly number of the residents of Lucknow assembled to witness the opening of a silo pit in the compound of the Civil Church. The pit was filled with wet grass in the beginning of August. The first sight of the preserved grass was not encouraging. It looked like a mass of mouldy matted vegetation, and emitted a pungent alcoholic smell. However, after a few inches had been removed, there was a perceptible improvement in the quality of the grass, and it quite fulfils the expectations of the chaplain. A pair of bullocks, apparently not abstainers, ate it with relish, notwithstanding its alcoholic properties. The greater part is quite sound, of a darkish yellow colour. At the bottom of the pit, next to the floor of broken bricks, the grass was welded together in a mouldy mass, and came away like torn matting. The sound part is now being dried, and it is expected that it will turn out to be good fodder when dry. The loss from mould was due to the faulty construction of the pit which, having no masonry sides, had to be dug on the slant—thus preventing an uniform downward pressure, and allowing of the entrance of moisture sideways from the surrounding soil."

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According to an English paper, a grand duello is now going on between two of the more recent sources of food supply at home. It says that until quite recently the Australian tinned meat trade distanced all competitors in its particular province. Efforts were made, from time to time, to win British favour for frozen meat importations, but with very little success. All this time, the importations of tinned meats continued to increase with startling rapidity. Beginning with the modest quantity of 4,702 cwts. in 1866, the trade reached its zenith, according to McCall's annual circular, in 1880 when 665,800 cwts. were landed in England. In the following year, however, there was a sensible falling off, and although 1883 witnessed a slight recovery, last year's record brings down the figure to 446,000 cwts. This large decrease is partly attributable, it appears, to the higher cost of the article consequent upon the exceptional demand in 1880. But English consumers would probably have been content to pay a little more for food to which they had grown accustomed, were it not for the superior attractions of frozen meat. That which has recently been coming from New Zealand in enormous quantities—one steamer lately landed 25,000 sheep's carcases—is a vast improvement on former importations, and now that it can be bought under its proper name at a low price, instead of as English mutton at a high one, it is coming into great favour among people of limited income. There is, however, a dark side to this picture. The latest news from the Colonies is not very hopeful. Owing to the continued drought for months, large tracts of country have been completely denuded of sheep and cattle. The loss in the former is estimated at about five millions. The frozen meat trade in the continent of Australia which gave such promise has been almost crippled. A large firm in Victoria has been worked at a loss of £5,000. The price of butchers' meat four years ago was 2*d.* to 3*d.*, beef 3*d.* to 4*d.* per pound. Now mutton has risen from 6*d.* to 7*d.* per pound, and beef from 9*d.* to 10*d.* Butter is selling at 1*s.* 3*d.*, and cheese at a shilling. In the matter of wheat, cultivation, the prospects are anything but cheering—at present it hardly covers the cost of production—and the rapid development of the wheat trade of India will only tend to make matters worse.

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The second report on the prospects of the wheat crop in the Bombay Presidency is as follows :—" Complete wheat returns have not been received. Dharwar 399,809 acres, seedlings germinated, crops middling. Ahmedabad 274,043 acres, crop withering in parts ; crop damaged by cloudy weather. Nasik 260,860 acres ; crop on the whole good, in gardens, crop likely to be blighted owing to December rain. Ahmednugger 249,518 acres, crop in places good, in others middling and poor owing to cloudy weather and excessive rain. Kaladgi 161,571 acres, crop in most places withered, no out-turn expected. Broach 119,238 acres ; crop very promising. Belgaum 107,911 acres ; crop on the whole fair ; in some parts it is injured by heavy rain and hailstorms, in others withering. Poona 99,245 acres ; crop generally doing well ; in parts it is affected by rust. Sholapore 46,253 acres ; crop fair, Surat 38,576 acres, crop good. Kaira 36,341 acres, crop good. Kolhapore 37,108 acres, crop middling. In Sindh crop progressing well, and in places shows prospects of a good season. Generally speaking, the wheat crop is good in the Guzerat districts, in the Deccan and Carnatic districts, except Kaladgi. The prospects of the crop have improved since the last report owing to the November and December rains.

In regard to the Mysore Gold Mining Company, Captain B. D. Plummer reported on the 2nd ultimo to his Directors :—"In Taylor's shaft, under the 173, the lode is looking as kindly as ever, but it is dipping north-west faster than the shaft can follow ; assay value 4 ozs. 18 dwts. of gold per ton. In the south end the lode is not so kindly looking as it was, but we are now getting south of the ground the old men worked upon. The lode is 3 ft. 6 in. wide in the north end, but all the rock below the 173 is very hard and spare to cut. The No. 1 winze, under the 173, is down within 2 ft. of the back of the 60 ft. level, and as the water is so quick, I have stopped it until the end is driven to it. Strange to say no lode of any value has been met with in this winze ; I am disappointed in consequence. In No. 2 winze under the 173 there is a very small rib of quartz, but of no intrinsic value. The progress has been very slow in the 173 north end on west lode. I have got another company of coolies to work it, and, perhaps, better progress will be made. The rock in the 173 north end on east lode is promising in appearance, and there is a rib of quartz 3 in. wide. In the 173 cross-cut west from east lode very good progress is made. The lode in the 173 rise in back of level is 3 ft. wide ; no assay has yet been made. The 135 north end on east lode is uncommonly good looking quartz, but there has not been any assay yet made. Stamping : This goes on in a satisfactory manner. We have the four sets of elephant stamps at work, but the bulk of the ore we have to stamp is of low grade ; however, we shall be able to send you home for this month a pretty good gold bar, though not so much as last month.'

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Mr. J. S. Gamble, Conservator of Forests, Northern Circle, reported to the Board of Revenue as follows :—The question of what is the best tree to plant for avenues is entirely one of (1) climate and (2) soil. The same trees which would form magnificent avenues along the roads in Malabar would, most of them, fail altogether along those of Bellary or Vizagapatam. So far as the Northern Circle is concerned, omitting Nilgiris, the climate is dry, with the few exceptions of the hill tracts of the Circars of the Nallamalai hills. Scarcely anywhere does the rainfall exceed 50 inches. On the other hand, the soil varies extremely from the alluvial plains of the Godavari delta to the nearly bare metamorphic plateaux of Cuddapah and Bellary. Roughly speaking, however, we may classify the soils as follows :—(1) Rice lands on alluvium. (2) Laterite and the red soil which is produced by its decomposition. (3) Decomposed metamorphic soils, and gravel or sand and boulders. (4) Black cotton soil. (5) River sand. Along roads passing through the great rice country like the coast from the Godavari delta down to Pulicat, probably no better trees can be found than the figs, *viz.*, the Banyan (Ficus bengalensis), the Pipal (Ficus religiosa), and the Pakar (Ficus infectoria), with its allies (Ficus benjamina and Ficus tsiels). On these, the first is the best, though to avoid the damage referred to in the Board's paragraph 2 it might be kept away from bridges or culverts. There is probably no tree which so quickly reaches a size fit to give shade as the banyan, and it is easily propagated by cuttings consisting of stout poles, perhaps even 6 to 12 inches in girth and 10 to 12 feet high. They must, of course, be planted during the rainy season and fenced, and if the rains fail afterwards, they may require watering. In such places also the mango does well on ground slightly raised above the level of rice fields, and the Margosa (Melia azadirachta) and Jaman (Eugenia Jambolana) will also thrive. Another good tree for such places is the Kadem (Anthocephalus Cadamba) which is very fast grown and easily raised. Near the foot of the hills, Pterocarpus marsupium might perhaps be grown with advantage. On laterite and lateritic soils the mango generally thrives well, and the jaman will also grow ; but the figs should be avoided. Teak may be grown, but is a very bad avenue tree, as it is leafless when shade is most wanted, and the shedding of its large leaves is probably bad for the roads. But whatever is planted, care must be taken to dig the hole deeply, and provide good soil to fill them when the planting takes place.

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On high level sandy soils, the result of decomposed gneiss and schists, figs may be grown if the soil is fairly good and the holes are well dug. So may the mango, but the best trees are the tamarind, the margosa, and the sankesula (Telugu) (Poinciana elata). Good avenues of these may be seen in various parts of the Cuddapah plateau, in Kurnool, Bellary and Anantapore. Another very good tree is the Kanuga (Pongamia glabra), which gives a good shade and has a fruit which is valuable for its oil. The Dirisana (Albizzia lebbek) is much grown in such places, but is untidy and by no means so useful as the margosa, which has the valuable property of being in full flower and young leaf in the hot season when its shade is most necessary. On black cotton soil there are only a few trees which thrive. The tamarind and margosa are perhaps the best, but a good plan is to grow the Babul (Acacia arabica) rather thickly by sowing in large patches protected by thorns and then thinning out to one or two good stems. Other, but smaller, trees which will grow are the Parkinsonia aculeata Albizzia lebbek and Balanites æguyptiaca. When river sand has to be planted—which occasionally happens—probably the best tree is the palmyra palm (Borassus flabelliformis), but the jaman, margosa and babul may also be grown, while near the sea there are few kinds so useful as Calophyllum inophlylum and Terminalia catappa. In some places the casuarina may be grown, but it is often untidy and does not give a good shade in avenues. There are many other trees which are occasionally planted in this presidency. There is the Cassia siamia, to which his Excellency the Governor referred as being so common round Madanapalle, though, as remarked by him, it rarely makes a good avenue tree. There is the Deodom or Asoka (Polyalthia longifolia), which makes a beautiful avenue tree when it thrives, as it does in places along the coast. The Cork-tree (Millintonia hortensis) is often planted and is very pretty and sweet-scented but brittle, and so is the gold-mohur tree, the brilliant Poinciana regia. Near canals where the soil is not salt, Sissu (Dalbergia sissoo) is useful, and as along the Kendrapara canal, in Orissa, the cocoanut and calophyllum may usefully be grown where there is some salt in the soil. To sum up, for general purposes, the best trees are the banyan, mango and margosa, but where special circumstances make others necessary, some of those I have mentioned will probably be best to use. On the subject of avenue planting, I would recommend the consultation Ribbentrop's 'Arboriculture in the *Punjab*' and Sinclair's 'Notes on Arboriculture in the Bombay Presidency,' a little book lately published by the Bombay Agricultural Department. Before concluding, I would beg to offer a *few* remarks regarding roads on the Nilgiri plateau, where the presence of avenue trees or an avenue belt is so valuable as a protection against the cold bleak winds of either monsoon. The value of the belt of Blue gum (Eucalyptus globulus) and Wattle (Acacia melanoxylon and Dealbata) along the road from Coonoor to Ootacamund is obvious to all who travel along it in bad weather, and this belt should be continued along all public roads. The best tree to use is undoubtedly the Acacia melanoxylon, which is stronger and more shady than the others, and not troublesome like the silver wattle ; but some conifers, and specially (Cupressus macrocarpa) should also be grown. Where such roads cross swampy land, Willow (Salix tetras-perma) which grows most readily from cuttings, should be planted.

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The accounts of the Cinchona and Devala Moyar Company show a profit on the year's working of £591. The cultivation expenses of coffee and cinchona amount to £2,735. The proceeds of the *coffee crop* were *£1,766, of* cinchona *£1,112*. Dividends on investments and interest were £2,476. The report states that the time had not yet come when they could arrive at a decision as to the real value of the Company's mining property. The Directors cannot advise as yet abandoning the mining enterprise, involving, as it would, the total loss of the capital expended ; and they propose continuing to push on the works with vigour. The cinchona trees were being increased in number ; the nurseries also were in a flourishing condition. The possibility of profitably cultivating rhea and other grasses is continuing to have the Directors' attention ; but the time has not yet arrived, in their opinion, *for taking* positive action. The proposed agreement with the Rhodes Reef Gold-Mining Company has been made, and the liquidation of that Company is proceeding in the manner contemplated.

THE following extract taken from a special report submitted lately by the Commissioner of Coorg on the subject of coffee enterprise, will be found interesting :—" The cultivation of coffee was introduced into Coorg, in 1835 by Major LeHardy, the first Superindendent, was confined at first to the two estates on the Mercara plateau, known as 'Beuvoir' and the 'Mercara estate' and to a few holdings owned by Mopla settlers near Nalknad in the Padinalknad Taluk In 1858 land was opened on the Periyambadi Ghat, and in 1863 a great stimulus was given to the enterprise by the rise in the price of coffee, when clearings were first made at Madenad on the Sampaji Ghat. Unfortunately some of the first settlers who came from Ceylon set the pernicious example, which was followed by all planters for the first fifteen years, of clearing and burning the forest instead of adopting the safer but less remunerative method which is followed in Mysore of growing coffee under primeval or secondary shade. Other mistakes were made in land having been taken up for cultivation without regard to the excessive rain-fall and the steepness of the hill-sides. The forest, which crowned the mountain crests and covered the rocky spurs, was indiscriminately felled, so as to obtain a large open field for coffee, by which means the estates were deprived of valuable leaf manure, and the greater portion of them became exposed to the full blast of the south-west monsoon, or the still more trying hot east winds. So long as labor was cheap and plentiful, the system of hand weeding, which caused little disturbance of soil, was followed ; but as it grew dearer, the *mamoti* (native hoe) came generally into use for the removal of weeds, which grew rank and long from not being eradicated in time. It would not have mattered much, had the lands been comparatively flat as in the 'Bamboo' and in the Wynaad where it is practised with advantage, but in a mountainous country with a heavy rain-fall varying from 140 to 240 inches in the year, it loosened the surface soil so greatly as to lead to its being gradually washed away ; and the trees thus became unable to assimilate nutriment, even when supplied to them in the form of expensive manures. The system pursued was not only faulty, but climatic influences and pests, over which the planters had no control, have greatly tended towards the deterioration of estates. The seasons have proved of late years most unfavorable, especially on the Sampaji Ghat, where the early blossom showers, which are expected in the end of March and in April, did not fall till May, which was too late to ensure the healthy development of the blossom and fructification of the berry during the monsoon. The coffee trees have suffered also from borer (*xylotrechus quadrupes*), bug (*lecanum coffeæ*), and leaf rot, and lastly from the leaf disease (*hamedica vastatrix*) which has caused so much loss in Ceylon."

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IT may be safely asserted that the pioneers, who obtained free on application large tracts of forests from Government and had the advantage of cheap labor, and the valuable compost arising from the burnt forest to aid the cultivation, were the only persons who derived substantial profits ; but it was only for the first few years, and chiefly from the high prices paid to them for the land by the companies which they succeeded in establishing. As profits decreased through mismanagement and the ravages caused by the borer, less funds were available for high cultivation, which became essentially needed, owing to the rapid deterioration of the soil. The result has been that all the companies were wound up within a few years, and many of the estates fell at almost nominal prices into the hands of the managers and agents, who, though experienced men, became thus possessed of much more land than they could well cultivate. Subsequently with adverse seasons the condition of the estates has been passing from bad to worse. The humus having been washed away, it seems only a question of time as to when their entire abandonment will take place. On many estates only long rows of weather-beaten sticks are to be seen, bearing a few shrivelled leaves with a few patches of good coffee still left in low-lying valleys and in sheltered nooks. Such being the case, it is no ground for surprise that these properties have now no market value ; for when put up to auction, no bids are made for them. There are a few estates, which are not quite so bad as others, owing to good management and high cultivation ; but it is doubtful whether any of the forest or ghat estates have of late years been worked at a profit sufficient to meet the interest on advances made by firms, any realized in one year, such as the last, being fully absorbed by the losses which have accrued in the years preceding or following. These statements are supported by the testimony of unanswerable facts. Between the year 1870 and 1880, 18,476 acres of coffee land were abandoned, and are now over-grown with lanthana ; in 1881, 593 acres ; in 1882, 2,156 acres ; in the current year resignations have been received for 2,344 acres, making a grand total of 23,569 acres, which at Rs. 2 per acre (the assessment charged) represents an annual loss in revenue to Government of Rs. 47,138. The loss of capital to those who have invested in the enterprise cannot be so accurately stated, but it may be roughly estimated at £67,000."

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" ALTHOUGH planters have become wiser after their dearly bought experience, it cannot be denied that errors were made by the authorities in the commencement by the free grant to them of too extensive tracts of forest land without any stipulations as to the reservations of belts of forest and the mode of culture. Government did not, however, remain wholly callous to the losses which were taking place ; for, consideration was shown in the remission of the assessment due on portions of estates which had to be abandoned ; while others received in exchange valuable land in the 'Bamboo,' by which they were enabled to recoup the losses which they had sustained on ghat land. The latter arrangement was, however, so obviously detrimental to the interests of Government and unfair to new-comers, that it had to be discontinued. Lately, the continued losses which the planters generally have suffered, and the sight of the deserted bungalows and lanthana covered estates, which meet the eye all along the Sampaji Ghat, and in the greater part of the forest and the Mercara plateau, have necessitated the grant of still more liberal concessions in the way of remissions and suspensions of assessment, in the hope that proprietors and mortgagees, notwithstanding the difficulties which surround them, may be encouraged to undertake the cultivation of other products, such as cinchona, cardamoms, tea, and rubber on lands which are unfit for coffee, and the abandonment of which has been frequently contemplated."

THE DEPARTMENT OF AGRICULTURE IN MADRAS.

THE Report of the Director of Agriculture and Revenue Settlement for 1883-84 has recently been issued by the Government of Madras. It is dated 16th September, but as it was submitted through the Board of Revenue, there has been some delay in its appearance. Up to the year under review, 11 districts of the Presidency have been revised and settled. The Settlement Department has been at work for 26 years, and in that time has dealt with an area of 12,933,493 acres. The immediate financial result of the re-settlement of districts was an increase of Rs. 16,39,553 to the former assessments. This increase represents a return of 7·3 per cent, on an outlay of Rs. 2,22,38,700, of which Rs. 75,29,507 represent the expenditure on settlement, and Rs. 1,47,09,193, that on survey. In regard to the organization and maintenance of village records, upon which so much stress was laid in the G. O. of the previous year, all that seems to have been done is to record a discussion that took place about rendering the post of Revenue Inspectors, or *Kanungoes*, a qualifying grade for Tehsildarship ; we cannot congratulate the officers, on their success in giving " a record of standing information regarding the agricultural conditions of each district." The second head deals with the analysis of districts with reference to security from famine. This system has been inaugurated in conformity with the requirements of the Government of India, as set forth in paras. 9 and 10 of their Resolution of the 8th December 1881. Kurnool being one of the smallest districts in the Presidency, and as it suffered more severely than any others that were stricken with famine, between 1876 and 1878, it was taken in hand first. We will quote here the words of the Report to show how far matters have advanced in this direction. It says :—" So far as materials are available here, the analysis is nearly completed, but the enquiry has revealed how much is wanted to make the analysis as complete as the Government of India wish it to be. So far as the district generally, or certain well-defined sections of it, are concerned, the information that is available in this and the Board's offices would suffice for broad and tolerably accurate conclusions regarding its agricultural conditions, but the Government of India prescribe an analysis that is much too minute to be satisfied without considerable local enquiry. The information at head-quarters does not generally go below taluks, whereas the requirements of the Government of India demand an examination of the condition of villages." Considering that the instructions, based on the recommendations of the Famine Commission, were given so far back as 1881, we may safely presume that if a little more despatch is not used in travelling beyond the initiatory stage, it is likely another calamity may overtake the country before we can utilise the results of past experience for any practical purpose. The report makes a clean breast of its shortcomings, and acknowledges that any rapidity of progress is impossible without other help than the ordinary establishment of the office can afford. It is therefore proposed to ask the assistance of the Agricultural Reporter and the staff of agricultural inspectors for the work. The question now is, whether any additional burden can be thrown on the shoulders of these already hard-worked gentlemen without detriment to their legitimate duties. In connection with forest protection, it appears from the administration report that the area of reserved forests in the Presidency, at the end of the year under review, was 2,869 square miles, of which 132½ square miles were reserved. The chief operations of the year were the planting up of three acres of the farm land with *Divi-Divi* (*Cæsalpinia coriaria*) and the importation from Queensland of a large quantity of eucalyptus seed for distribution to districts. The Australian Salt Bush (*Atriplex nummalaria*) seems to have done fairly well at the farm, where some of the plants have seeded. Attention also has been given to the discovery of indigenous salt-feeders, which might be found effective in the reclamation of saline soils and as useful for fodder as the bush of Australia. One variety found at Ennore is eaten freely by the cattle, and is identified by Professor Lawson as the *obione konigu*. Under the head of irrigation we are told that no new work was undertaken; the minor irrigation works, that is, all works irrigating less than 200 acres, are now managed in the Revenue Department. These works irrigated a nominal area of more than 112,000 acres, and the revenue derived was close upon Rs. 6,00,000; a little more than half of this amount was expended in repairs. Lands irrigated from wells sunk in dry land have in the Madras Presidency been long exempted from extra assessment on this account, but lands, whether wet or dry, irrigated from wells sunk in irrigated lands, have not hitherto shared in the exemption. On this subject, a communication was addressed to Government by the late head Sheristadar to the Board of Revenue, in which he urged that the principle should be extended, at least partly, to lands irrigated from what are known as "ayacut" wells. The Director of Agriculture agreed with the proposal submitted to Government, provided the wells were the sole source of supply. The Board of Revenue, however, did not endorse these views, as the subject was very fully discussed some years ago, and they did not see the advisability of re-opening it. But the Government took the former of the views of the matter, and has granted the concession. The Government Farm and the School of Agriculture at Saidapet has hitherto been managed by Mr. Robertson, who was at once Superintendent of the Farm and Principal of the School. But from the 1st of April 1884, this arrangement has ceased; and while Mr. Robertson has been placed in charge of the Agricultural College, Mr. Benson has become Agricultural Reporter and Superintendent of Farms. Mr. Benson reports on the agricultural conditions of the year as being very unfavourable; they are characterised as long droughts followed by heavy rain-fall; "the consequence was the universal loss of the grain crops from insects, rust, mildew and other diseases." The only crops that did fairly well were *ragi*, and some of the irrigated paddy. A great many experiments were undertaken at the farm with indifferent results; excepting the trial of red and white wheat from the Punjab. The experiments with manures, the most noticeable of which was with common salt, used as a top-dressing for *ragi*, and *sorghum saccharatum*, gave indifferent results. This is no doubt due to the poorness of the soil, for at para. 87, Mr. Benson "doubts whether any really useful manuring experiments can ever be carried out on the Saidapet farm," and in another communication he is more explicit by expressing the opinion that to experiment there with manures is "a waste of time and money." He is not singular in his belief, for as pointed out by Mr. Robertson, the land is only fit for growing fodder. The Board of Revenue remarks on what Mr. Wilson says regarding the farm:—"The Board have on several occasions lately placed before Government their views on the failure of this farm, and need not now reiterate them. They, however, emphasize the tone of regret for wasted opportunities which underlies these eleven paragraphs of the Director's Report." We fail to endorse the Board's views on the subject, for after going carefully through them, we fail to see any indication of a single opportunity having been allowed to waste. We can pretty well guess at the meaning of the Board; it was a covert attack upon the so-called "neglect of Mr. Robertson, who has evidently been singled out as the scapegoat, upon whose devoted head the vials of the Board's wrath has been emptied. Of experiments with seed and plants, very little need be said as they were almost universally failures; but one very useful and interesting fact was elicited as the result of a trial made by Messrs. Minchin & Co., of Aska, with *Sorghum Saccharatum*, viz., that though it may be impossible to make a marketable sugar from the syrup of the plant, its fresh juice may be fermented and used by the distiller for the manufacture of spirits. In the sale and distribution of agricultural implements, Messrs. Massey & Co. of Madras carried off the palm. The popularity of their ploughs may be judged from the fact that of a single type known, as "the improved country plough." they have sold no less than 587,206. Next comes the firm of Messrs. Thompson and Mylne, of Beheea, in Behar. During the current year they sold eighty-one of their portable sugar-mills, from January to August, of which seventy-five went to the single taluk of Hospet in Bellary. Several experiments were made with fibres. China and Cashmere silk-worms were found to thrive very well during the cold weather when there was sufficient food for them. The limited supply of the mulberry leaves, however, interfered with the success of the experiments. At Saidapet the worms refused to touch any but mulberry leaves, which accounts for the great mortality among them. In Rajamundry the defective supply of those leaves was supplemented by lettuce leaves. Mr. A. J. Stuart reported a most interesting experiment which he had made with the indigenous *tussur* silk-worms found in his district of North Arcot. The cocoons that were found in the jungle were placed in a cage made of bamboo, and hung among the branches of a country almond tree, to which the worms, when hatched, had free access, the leaves affording them sustenance. The cost of the experiment was a mere trifle, and it was found that the worms required little care. Of all the experiments tried for the solution, by a chemical agent, of the cement which glues the fibres of the tussur cocoons so tenaciously together, the most successful was a solution of one-fifth pound of carbonate of potash in a gallon of water. The other agents employed, although successful, were found to injure the thread.

Miscellaneous Items.

During the month of December, 46,413 bales of cotton, valued at Rs. 39,97,063, were shipped from Bombay.

The ship *Rajah of Cochin* has been chartered to convey about 300 emigrants from Madras to the Mauritius.

The Murree Brewery Company have obtained permission to erect an iron structure within the Arsenal-square, in the Fort of Bangalore, so as to utilise the existing building for brewing purposes.

The King of Corea lately issued an edict, in which he strongly remonstrated with the misdirected policy of the young men of the country, in aiming at official appointments to the neglect of their own trades.

More gold-fields are reported to have been discovered on the Russo-Chinese frontier of the Amoor, twelve miles from the frontier, on the Chinese side. The Russians are going over to the fields in swarms.

In exercise of the powers conferred by the Court Fees Act, 1870, the Governor-General in Council has remitted the fees payable on applications for loans under the Agriculturists' Loans Act XII of 1884.

The Nizam of Hyderabad is said to have decided to open a School of Agriculture in his dominions, and has applied to the School of Agriculture at Madras to supply him with a duly qualified superintendent.

The official demands made up to the 13th ultimo, for repairing the damages caused to Government irrigation and agricultural works in the Tanjore, Madura, and Tinnevelly districts by the recent heavy rains, amounted to Rs. 33,000.

According to statistics compiled in Europe there are 3,985 paper mills in the world, which make 1,904,000,000 pounds of paper every year, half of which is used for printing, and 600,000,000 of it for newspapers, which ten years ago required only 400,000,000 pounds.

An engine, said to be the smallest in the world, has been made by a watchmaker now connected with a watch-manufacturing company. As described, the engine is of the upright pattern, and is made of steel and gold. It rests on a 25-cent gold piece, and can be worked either by steam or compressed air. The cylinder is a little less than 1-16 inch in diameter, with a little less than 3-32 inch stroke. The balance wheel is ⅛ inch in diameter, and can make something like one thousand revolutions in a minute. The wrist-pin is a sapphire cut for the purpose.

The net imports of gold up to the end of December amounted to Rs. 4,36,98,371, and of silver to Rs. 9,44,37,448. The amount of bullion coined and examined at the Calcutta and Bombay mints was Rs. 3,65,84,682, of which sum the Calcutta mint only contributed Rs 5,27,003.

During the month of November last, there were shipped from ports in Sind to foreign ports 2,75,367 bags of wheat, weighing 547,305 cwts., and valued at Rs. 23,35,723, as against 1,90,869 bags, weighing 346,252 cwts., and valued at Rs. 15,45,107, during the corresponding month in 1883.

The Shanghai papers, alluding to Mr. Macaulay's attempt to establish a trade connexion between India and Tibet, express the belief that the Indian gardens can supply Tibet with teas of ordinary quality at a cheaper rate than China, both because the journey is shorter, and because the Indian article is better at the price.

A competent surveyor, with coolies, has arrived at Singapore from Madras, having been sent for by the Surveyor-General. We have had a good deal of Ceylon, and are now going to try India, apparently. The party will work in Penang and Province Wellesley, and the Commissioner of Lands Titles went to Penang recently to start the work.

The experiment of ostrich-breeding in Australia has been successful so far, the owners of 80 birds having already exported several shipments of feathers sufficient to yield a fair profit on the venture. The authorities of the Cape of Good Hope have placed an export duty of £100 per pair on ostriches, so that the Australian breeders have secured their birds just in time.

In an official report on the damage done along the Madras Railway by the cyclone at the end of November last, the Chief Engineer states that the force of the wind at the Yetthalacherru tank was so strong, that several bullocks and an entire flock of sheep were blown into the tank, and drowned. He estimates the velocity of the wind at upwards of 50 miles an hour.

Our coffee market, says a Ceylon paper, is now well supplied with parcels of good and fine plantation parchment, and at intervals during the recent holidays, there has been a fair amount of business in the better descriptions, which have found buyers at Rs. 42·50 to Rs. 43 f. o b., and in one or two instances exceptionally bold samples have realised even better rates.

During the late inundation at Pondicherry, Monsieur Jumeau, the Chief Engineer to the French Government, received into his bungalow at La Grande Etang, the whole of the inhabitants of the English villages of Erraspett and Ammaucoopum, numbering upwards of 300 souls, whom he supported at his own expense for a couple of days while their dwellings were under water.

Business in coffee is said to have been concluded for the year, as it has, as if by common consent, been curtailed to the narrowest dimensions both at public sale and by private contract, and only retail quantities have been offered and sold at about the previously reduced value, which is from 10*s*, to 15*s*. per cwt. lower than at the same time last year for all good useful and medium home-trade qualities.

The Governor of Pondicherry has applied to the Minister for the Colonies in Paris for an extraordinary grant of 4,000,000 francs (16½ lakhs of rupees), to meet the charges incidental to the late inundations. The amount, besides providing for the repairs and reconstruction of the roads, bridges, irrigation works, &c., includes a liberal sum for distribution among the ryots and others who lost their property during the floods.

Mr. B. Ribbentrop, Conservator of Forests in the Punjab, is appointed to act as Inspector-General of Forests until further orders. Mr. H. C. Hill, officiating Conservator of Forests, in charge of the Pegu Circle, British Burmah, acts as Conservator of Forests in the Punjab. Mr. E. P. Popert, Deputy Conservator of Forests in British Burmah, acts as Conservator of Forests in charge of the Pegu Circle.

California fruit-growers have discovered that apricots bleached with sulphur fumes and then dried in the sun are superior to those that are dried in any other manner, or that are canned. They regard this fact of very great importance to the whole State. It enables every fruit culturist, however limited his means, and however small the product of his orchards, to dry his own fruit for market, and makes him independent of the canning factories. It is also stated that fruit can be prepared in the same manner more cheaply than in any other, that its weight is better preserved, and that it is of superior flavour.

The trade of Kurrachee is rapidly developing. In 1872-73 the total value of imports and exports of all kind was only three-and-two-third crores; in the past year it amounted to very nearly nine crores. The trade with ports on the coast increased during the year by 18½ per cent and the foreign trade by more then 34 [illegible] About half of the foreign trade is with the United [illegible] Cotton manufactured goods, hardware, cutlery, [illegible]nery, and wrought brass were imported from England in unusually large quantities during the past year. The value of Indian products exported—which consisted chiefly of wheat, seeds, rawhides, and raw wool—exceeded three-and-a-half crores.

The price of kerosine oil is still drooping, for the supply is increasing faster than the consumption. From Baku in the Caucasus, there were exported from May to December last year about 3,356,298 gallons of kerosine, and 1,206,621 gallons of lubricating oil. A portion of these products went to the Black Sea and the Danubian Principalities; another went to the Mediterranean ports; a third to Russia proper and Germany; and a fourth to Persia and the Red Sea ports. It is locally expected that in time Baku naptha products will find their way to Saraks, Herat, and Candahar. It is asserted that the Baku springs are believed to be capable of furnishing 250,000,000 gallons of oil a year.

It has often been a cause of wonder why the fine flavoured cocoa grown in the island of Trinidad was not manufactured into chocolate on the spot, instead of being all sent to Europe for that purpose, and returned there in that form for their own consumption at a much higher price, and to a certain degree of deteriorated quality. The problem has at last been successfully solved by the manufactory established there under the management of Mr. J. Schæffer. With the appliance of the latest and best description of machinery chocolate of the choicest quality is made in Port of Spain from the finest cocoa grown in Trinidad and Venezuela, equal in every respect to the Menier brand which has acquired such world-wide reputation.

Much dissatisfaction is felt among the Covenanted portion of the French Government officials at Pondicherry, at the reduced rate, for converting the franc into rupee currency, which has been fixed by the Council-General. Hitherto the price has been francs 2·40, but for the current year it is to be francs, 2·06, being a reduction of 14 per cent, which means, practically, to a large number of *employés*, so much less pay. The case seems to be a very hard one, and is unsupported by any precedent in the administration of the Pondicherry Government. The salaries and allowances are given in francs, and should be paid in that coin, or the current equivalent in rupees. The action of the Council in reducing the value of the franc is looked upon as not only unjust, but illegal.

The *Madras Mail* says:—"We may some day obtain prime fresh Australian meat in Madras. The S. S. *Catterthun* sailed from Palmerston, in the Northern Territory of Australia, last month for Hong-Kong, with a trial shipment of ten bullocks each for Batavia and Singapore. A champagne spread was given on board, when the Government Resident eulogised the exporters. He said that they had now made trials of the market of Hong-Kong, Batavia, Singapore, and would anxiously and hopefully await the result. The pastoral development of the territory largely depended on the Indian and Eastern markets. There were myriads of consumers within three weeks' steam, and let a taste for Australian beef be created, and there would be no limit to the possibilities of the trade."

Selections.

BEE-REARING.

From J. C. Douglas, Esq., to the Secretary to the Government of India,—dated 9th January 1885.

I have the honour to report, for your record, the results of my agricultural observations during the past year.

2. I commenced the year with two stocks of the variety of *Apis indica* indigenous to Lower Bengal; one of these was a swarm I captured near my office at Alipore. As the weather became warm, these bees built comb, and they worked out artificial comb foundation, specially made for them from an engraved plate; from the rapidity with which they worked at the commencement of the season, I anticipated they would prove of value. Before, however, they had half filled their hives, they prepared to swarm, bred drones and queens, and I divided the two stocks into four. These did well, but I got absolutely no surplus honey. I took a few ounces, but I had to feed much more.

3. The variety of *Apis indica* is kept by villagers; they do not cultivate it at all, but merely encourage the bee by inserting earthen vessels in the house-walls, and they take the honey by taking all the combs, so that the stock perishes. I have received many estimates of the quantity of honey obtained, but they differ widely and are quite unreliable. Having taken many stocks and purchased others, and having kept the bee during two seasons, I am of opinion that it is commercially valueless. Possibly 5 or 6 pounds of honey might, under exceptional circumstances, be obtained by sacrificing the bees, but this is obviously insufficient to repay cultivation. This estimate is confirmed by an account of the cultivation of *A. indica* in Ceylon,—Journal, Ceylon Branch, Royal Asiatic Society, Volume VII, Part I, No. 23. Of the stocks, I had I gave one to a station master on the East India Railway and one to a native gentleman; both these are in hives. Mr. Stocks, of Berhampore, has a stock, from which he recently took half-a-pound of honey with an extractor. Mr. Stocks being favourably situated and having the appliances will further test the value of this bee under the most favourable circumstances. This bee is not so easily handled as good-tempered Italians, but is as easily managed as the European Black bee, and is better tempered than the cross between the Black and Italian.

4. This bee is valueless, because—(1) its stocks are too light in comb and bees; (2) it swarms too frequently, so that without trouble and much attention only very small hives can be filled; (3) the surplus honey is very small in quantity; (4) the bees do not

defend their hive against moth and other vermin, so they readily succumb to the moth, particularly during the rains.

5. Another variety found in Bhutan, building 5½ cells to the inch, appears far superior to the variety found in Lower Bengal. Captain R. Fulton, B.S.C., stationed at Buxa, has kept this variety. He gave me two stocks, one of which was very weak and failed; the other I have under observation. Captain R. Fulton also gave a stock to a gentleman at Barrackpore. This variety is larger and builds larger cells than the varieties found in the plains, Chumba, and cultivated about Mussoorie and elsewhere. I am informed its stocks are sufficiently heavy, but I have no data from which to judge of its commercial value; on this point I shall be able to give an opinion probably by the end of June next. This variety of species is, I believe, undescribed; the stock I have is exceedingly mild in disposition, the workers go out very early, and they readily use the comb of the Italian bees slightly contracting the cell by their outer edge, but they have the failing of not keeping their hive clear of vermin, particularly moth, which they suffer to live unmolested apparently on the floor-board of their hive. Should this variety prove of value stocks can be readily obtained, but I am decidedly of opinion this variety is very inferior in value to the Italian bee, even though it may prove sufficiently valuable to warrant its cultivation.

6. The variety found cultivated at Bushahr by Mr. Minniken appears to me equal to the European hive bees in productiveness; it is closely allied to the European species, and appears somewhat larger in size; whether it can be readily handled, whether it defends itself against moth and other vermin, and whether or not it swarms to such an extent as to reduce its value, can only be ascertained by observation. This variety or species is, I believe, undescribed. I am of opinion measures should be taken as early as practicable to ascertain the economic value under cultivation of this species. I have written to Mr. Minniken on the subject, and I now send two boxes with instructions for packing two stocks of these bees, which I should like to receive as early as practicable to admit of their being observed during the coming season, provided you are pleased to obtain them for me.

7. As to the possibility of cultivating the Italian bee, I am now quite convinced it can most certainly be cultivated here. I brought out five queens, of which I saved two, and in 1883, these two filled their hives, although they had at first but a few hundred bees; I had nursed these into strong stocks, when one of the queens died; I had no drones, and the rains prevented drone breeding. I had therefore only one stock left. I wrote for four queens, and these were sent by Sir G. Birdwood, but only two arrived alive; one of these became diseased, and I had to destroy her. I again sent for four stocks direct from Milan; of these I saved two queens, which are doing well. I bred a queen, the first bred in India; this queen is doing very well; her stock is very vigorous. I was obliged to remove it from the apiary as it attacked another stock, and robbed it of all its stores. I have now five queens with bees; the stocks are still weak, but I have no doubt whatever I shall be able to distribute during the coming season queens and bees to perhaps a dozen persons who are prepared to receive them. One of the queens was born in 1882; she is now 2½ years old at least, and has been in India more than two years; she has furnished bees and brood for all the other queens, and to keep up diseased stocks, and last year I took 15lbs. of excellent honey from her stock, which, as it was kept in Park-street, Calcutta, had very little opportunity of furnishing a rich harvest. I found the bees did exceedingly well; they kept their hives clear of wax moth and other vermin. I found two deaths—head moths in one hive, evidently destroyed by the bees. I find the bees can get pollen all the year round; it was feared they might not get anything in December and January, but they get almost too much pollen during those months; they are getting honey now.

8. The largest yield per stock I have had reported for *Apis indica* is 30lbs. of honey; this is reported by Mr. Seymour of Mussooree. This gentleman has kept bees for several years in Australia, and his testimony is therefore of considerable value. He thinks bee-keeping with *Apis indica* as found about Mussooree very inferior economically to the culture of *A. mellifica* in Australia. Setting aside such figures as 500 and 600lb. per stock, in America G. M. Doolittle, an apiarist of great experience, considers 50lbs. of comb honey or 75lbs. of extracted honey an average crop per stock. Thirty-one Canadian bee-keepers had 1,484 stocks in the spring of 1884; increased to 2,569 stocks during the year; they took 37,250lbs. of comb honey and 59,845lbs. of extracted honey. I think one pound of comb honey equal to quite 1½lbs. of extracted, and so estimated, the yield as above was equal to an average of 80lbs. of extracted honey and an increase of 90 per cent in stocks of bees. The crop of the year was considered scarcely up to the average. The severe and long American and European winters render apiculture more precarious than in the plains of India, or even in the hills. The great superiority of *A. mellifica* over *A. indica*, and the importance of acclimatising the former is apparent; the Bushahr bee might prove as productive as, or more so than, *A. mellifica*.

9. I could have distributed stocks last year had I wished, the one queen would have supplied bees, queens, and drones, but I preferred to import other queens rather than breed in and in. The journey from Europe is very injurious to the queens; even those which appear to arrive in good health are commonly found ultimately to have suffered in their laying powers, or to have become diseased. Knowledge of this fact induced me to import a number of queens in the hope of saving a few, and the ignoring of this has caused the failure of all previous attempts to introduce the European bee into India.

10. During the year I have issued a number of hives and other appliances to persons anxious to take up apiculture in different parts of India; these persons are practising and learning on *Apis indica*. The issue of Italian bees during the coming season will, I have no doubt, confirm these persons in their resolves, and spread the practice to many others. The Italian bees will be issued to bee-keepers in British Burmah, Assam, Orissa, Bengal Proper, Mussooree and Dehra, Bhootan, and elsewhere.

11. As to the natural history of Indian bees of the genus *Apis*, very little is known; several varieties of *A. indica* and *A. dorsata*, and *A. florea* have been described, but there is much confusion in naming them; in most cases the descriptions are incomplete, not including the descriptions of drone, queen, and comb; the life history has not been studied, and some Indian honey bees have not been described at all, being quite unknown to European naturalists. In 1862, Dr. Gerstalker of Berlin discussed the classification of Indian honey bees in a paper read to the "Wander-Versammlung Deutscher Bienenwirthe," and he pointed out the confusion that existed in nomenclature and excellent grounds for a classification so far as the available knowledge admitted. Since the decease of the late Mr. F. Smith, I am informed there is no member of the British Museum staff specially qualified by knowledge of this genus of insects.

12. In my little Handbook of Bee-keeping for India, I described a typical *A. indica*, and omitted all mention of the varieties and their synonymous names. I am about to carefully examine the collection I have, and I hope to obtain other specimens. Specimens, particularly if including the drone, queen, and a small piece of comb, would be of great service. I have no doubt, whatever, I shall be able to add considerably to the existing knowledge of Indian honey bees and their life history, as well as discover some of economic value; in both the Bhootan and Bushahr bees, it appears probable insects of economic value have already been discovered; it remains to decide by observation how these compare severally with the Italian bee now rendered available.

13. As I am about to examine, compare, measure, and describe all the Indian honey bees of which I can obtain specimens, and also to endeavour to discover their affinities and the bearings of these on the origin of the European hive bee, which probably originated in Asia, and as I may not only be able to indicate the best variety and best mode of cultivating it for the benefit of the natives of India, but I may also obtain information of economic and scientific importance to European and American apiculture, I beg that any *spare* specimens of the number collected by Dr. G. Bidie may be sent to me.

Instructions for transferring and packing Bees in portable Hive.

SMOKE the bees slightly, spray them with thin syrup unless they have honey accessible in their combs; then with smoke, by shaking and brushing the bees from the combs remove the combs one at a time. Fit the combs into the frames against the top bar, cutting the top of the comb straight, if necessary, and filling up the frames with pieces of comb, if available. The wire-fixers are for holding the comb in the frames while tying it in. Tie the comb in the frames by stout twine at every two inches vertically and horizontally. Very white new combs should be rejected; very thick heavy combs containing much honey and sealed may, be pared with a knife to one inch. The brood combs, if any, should be placed in the centre frames. If there be much honey in the combs, other food may not be necessary, but full combs travel badly, and food may be given by mixing honey and crushed white sugar to a stiff paste and filling the food-box with it. The water bottles should be filled and so corked that the water does not come out unless the bottle be shaken.

2. The combs having been transferred, shake or brush the remaining bees into the box, close carefully with cloth or by other means the ventilators of the box, cover the top and open the door; place the portable hive in the place of the old hive. The portable hive with its entrance, as far as practicable, with some place as the entrance of the old hive should be left till evening; after dark, when the bees are all in, the door should be closed, the ventilators opened, and the box despatched.

3. If the weather be very cold, the side ventilators may be partly covered, but otherwise they should be left quite uncovered. One brood comb at least should be inserted, if possible, even if from another stock, as the presence of brood prevents absconding.

4. If detained on the road, the bees may be allowed to fly, the door being opened, and closed again after dark. *Whenever the door is opened, the side ventilators must be completely closed.*

Unless the boxes are to be closed longer than a week, it would not be desirable to open the hive boxes *en route*, and then only if some one is present who could hive the bees if they swarmed out.

5. It will be found convenient in transferring to remove all the frames from the box and put the lid on; as each comb is cut out of the old hive, *brush the bees from it into the box and put on the cover; if the principal cluster be gently lifted* and shaken into the box, there will be no fear of the queen having been left behind.

See also "Driving" and "Transferring" in the Handbook of Bee-keeping for India.

6. The boxes contain a veil, smoker, spray diffuser, and one dozen comb fixers; the articles should be retained excepting the latter, which may, if necessary, be left in the comb, but should, if practicable, be removed.

THE SIBI HORSE FAIR.

[FROM A CORRESPONDENT.]

THERE has been an unusual stir and bustle about the sleepy little station of Sibi, and the bazaars are once more as crowded as they were in the war time. But now the gathering is a peaceful one. The Government Horse-Breeding Department last year discovered what a grand field they had amongst the Beluchis. The active Superintendent, Mr. Grainger, came to Sibi and Quetta, saw some hastily collected mares, branded about 150, and sent to Beluchistan three stallions. This year a fair was started by the Political Agent, Mr. R. J. Bruce, C I.E., and considering that it is a first attempt, it must be reckoned to be a great success. I understand the Veterinary Surgeons present declared that they have seen no such collection of mares before on this side of India.

The Agent to the Governor-General is here, and several officers belonging to the Cavalry Corps in Biluchistan. I observe also some of the Biluch chiefs from the Punjab were present as well as many other Kibzai, Kakar, and Musakhel sirdars. These latter come from Thul Chotiali, accompanied by the Assistant Political Agent, Captain Gaisford. Of course the Horse-Breeding Department is fully represented, but there is a great absence of buyers, only two regiments having sent officers to purchase. This is to be accounted for by the very short notice that was given about the Fair. When it is known how good these hardy mares are, there can be no doubt that there will be an immense demand for them. The chief's camp on the Sibi plain where the Political Agent had arranged tents for them, instead of their having to search for quarters in the town of Sibi, was very picturesque. On the 12th instant, nearly everybody had arrived, and the horses were classified. This was no easy job, as all were new to the work, and the exhibitors had not the smallest idea of what was wanted. The inexhaustible energy of Rai Bahadoor Hitu Ram, the Native Assistant to the Governor-General's Agent however, worked wonders, and in the afternoon everything was ready. The next morning the judging commenced, and as many people would probably like to know the numbers and descriptions of animals shown, a rapid survey of the various classes may be acceptable. Class I. was for branded mares, over four years of age and over 14-1 in height. For this sixty-nine contended for the ten prizes, valued at Rs. 400. Nearly all these mares were good ones, and the ten that were finally left in the ring would be very hard to equal in India. The winner was a big blood-looking mare, about 15 2, with a foal at foot (three days old) to the grand waler *Bluelight*.

Class II. was for unbranded mares, over four years old and over 14-1 in height This class was very well represented. There were fifteen prizes, aggregating Rs. 515. For these no less than 320 mares entered, and the judges had a very difficult task. All the prize winners were large, roomy, big-boned mares, the three first being especially good specimens.

Class III. was for branded mares 14-1 and under, and over four years. For this there were only three entries, two of which were awarded prizes, value Rs. 35.

Class IV. was for unbranded mares 14-1 and under and over four years old. This was only fairly represented. Nine entries, 4 prizes, value Rs. 100.

Class V. for fillies, three and four years of age, was well represented, forty entries, four prizes, value Rs. 100.

Class VI. Colts, three and four years of age, 30 entries, four prizes, value Rs 115. These were a poor lot, but as it is desired to encourage the zemindars to raise colts, the rewards were liberal.

Class VII. Fillies under three years old, five prizes, value Rs. 145. For this, twenty eight very nice youngsters were paraded.

Class VIII. Colts under three years old, four prizes, Rs. 75, twelve entries, again a bad lot.

Class IX. Horses over 14-1 and over four years, four prizes, Rs. 150, fifty entries ; a very poor lot

Class X. Geldings, five entries, Rs. 75 ; a wretched show, but the prizes were given *pour encourager les autres*.

Class XI Entire country-bred horses that had been used for covering, 85 entries, prizes withheld. There was a considerable commotion in the ring as these brutes were led round. Most were unsound, and all were coarse and underbred-looking. However, these are the animals used in the district, and their exhibition ought to incite the Horse-Breeding Department to send a sufficient supply of good stallions without delay. It is ten thousand pities that the splendid mares of this country should be mated as they now are.

There were thus Rs. 1,785 awarded in prizes, and fifty-six horses were judged by the Committee. The judges were Major Carr, 5th Punjab Cavalry ; Mr. J. R. Grainger, head of the Remount Department, Bombay ; Veterinary Surgeon Reymond, Quetta, and Captain Gaisford, Assistant Political Agent. Ten remounts were purchased at an average of rupees one hundred and eighty. These will doubtless be found very cheap buys, and prove most useful horses. To those who have not yet seen the Biluch mares, it may be explained that their chief characteristics are hardiness and endurance. They are nearly all good-tempered, have generally plenty of bone, and very few of them brush. Nearly all are unshod. If mated to short backed, compact horses, with blood and action, their produce would be very valuable. Giving prizes for geldings is at the best but a half measure. As horse-breeding operations are being started afresh, it would be a splendid opportunity to try the oft-suggested remedy of putting a tax on stallions, although perhaps such a measure could not be introduced under present circumstances into Biluchistan.

On the 14th instant the races came off : and to the Biluchis this was by far the best part of the Fair. Unfortunately the morning was a wet one, and as the clouds looked like "staying," it was determined to run the races off as soon as possible. Notwithstanding the drizzle there was a large concourse of natives, and all the sirdars were present. The course was very heavy and a little over two miles long. The Biluchis, however, complained that it was not nearly long enough, and suggested that four miles was the minimum it should have been. Seventy-six starters went to the post. They were divided into three heats. The winner of each was to get Rs. 50, and the first four of each heat were to compete for the final contest. Most of the mares had been trained very fine, no grass whatever being allowed for the last three days, but unlimited gram. The jockeys wore their ordinary clothing, and rode barebacked with ring-snaffle bridles. As soon as the first start was effected, it was evident there was to be no mistake about the pace. The "finishing" commenced after the first hundred yards. The jockeys stuck to the mares like wax, and kept up a shower of blows, with a very light whip however. The horses ran very gamely, and came along at a really good rate. The winner of the first heat was a blood-looking four-year-old mare, got by a Jacobabad Government Arab, the property of Sirdar Shah Baz Khan, chief of the Bugti tribe. Notwithstanding the distance and the heavy course, none of the animals appeared any the worse for the great exertion they had undergone. After the three heats had been run off, the clouds looked still more threatening. The final heat was to have been run off in the afternoon, just before the Governor-General's Agent's Durbar, but all the winners petitioned that it might be settled forthwith. The winners of the last heat had barely time to catch their wind before they were walked back to the starting post. The pace of the final race was every bit as fast as the others. The result was that the Arab-Bugti mare again won, whilst the second, a horse, was also half Arab.

Rain having fallen on the afternoon of the 14th, the Durbar was postponed until the 15th, when the prizes were distributed by the Governor-General's Agent, Sir Robert Sandeman.

I may add that among the visitors attending the fair, I noticed Colonel Sir R Sandeman, K.C.S.I ; Mr R. J. Bruce, C.I.E ; Major Plowden ; Mr. H. Barnes, C.S ; Captain Hope ; Captain McIvor ; Major Armstrong, 5th B.C. ; Captain Jackson, 1st Bombay Lancers : Mr. Murray, 17th Regiment ; Dr. Fullerton ; Captain Wahab R. E. ; &c , &c.

The Khan of Khelat also sent his chief minister, Nawab Mahomed Khan, and a batch of mares and stallions. A diploma was given to the Khan for two mares and two country stallions.—*Pioneer*

DEODAR PLANTING.

As an old Forest Officer, and one who has done a great deal of deodar planting, I trust I may be excused if I say a few words about the system adopted in Kulu, and described at page 466 of your number for October. I quite agree with the employment of boys. I have always found them much quicker in learning and smarter in planting than either men or women ; but as regards the Kulu method, I am sorry to say I cannot see the use of it, and think it must certainly be much more expensive and slower in execution than the system of planting in holes. In the first place I have always found that young deodar of 20 months old are quite strong enough to be planted out, they are then 9 inches high (if below that, I never put them out), and I see no use in keeping them in the nursery another year ; this, however, is a fault on the right side ; the parts of the Kulu method to which I would take exception are, the trench and the number of plants used. Of course lines must be cut through the jungle, otherwise no planting could be done. I therefore pass on, merely remarking, that in my opinion, 10 feet between the lines is too far. Deodar should be planted in lines not over 5 feet apart ; there is no doubt they thrive better and throw out less branches when they are grown close together, and as they are found in dense thickets growing naturally, we can do no harm in this case in following nature. As regards the small trenches made in Kulu, it appears to me that they must be at least four times as expensive as holes, and as four plants are put in a space of 2 feet, it stands to reason that there is a waste of three plants, for it is impossible for four *trees* to exist 6 inches apart. I hold that as it is quite possible to plant deodar in holes 5 feet apart without 10 per cent of loss ; it is therefore sheer waste of material, time and money, to dig small trenches 2 feet long, and put four plants within the 2 feet. As for the little dab of mud to stick the plant against the wall, I see no harm in it at all. I am sure many officers must have seen continuous lines of deodar, planted simultaneously, as in the Kalatop Forest, near Dalhousie ; as therefore, it is possible to plant successfully at 5 feet apart in holes, I cannot see the use of an expensive trench and the waste of three plants. When I planted deodar in former years (and I have done it with less than 10 per cent of loss), I worked as follows :—Lines were cut through the jungle, where necessary, at about 5 feet apart, then men with "pharwas" cut deeply into the soil three or four times, at points 5 feet apart in the lines, whilst after them came boys or men with "khurpas," who dug the hole to the required depth, leaving the loose soil on the lower side ; this was done some days or even weeks before the actual planting took place. Planting was done by boys who had been carefully trained to the work ; the plant was held at the required height above the bottom of the hole so that the end of the root was not bent or curled upwards ; this was then fixed in the earth with a lump of mud, and loose soil from above the hole gently crumbled about the roots and gradually pressed down all round. I consider this plan far simpler than the Kulu one, less expensive, and one that does not require such careful supervision, all of which are of great importance to a Forest officer who cannot always be present when planting is going on. There is really no more difficulty in planting a deodar than in planting a cabbage ; the principal things required are that the root shall not be injured in taking out of the nursery, and shall be fixed properly in the earth when planted out. To conclude, I have no doubt the Kulu method gives excellent results, but I maintain that it is a tedious and expensive one, and as long as single plants can be successfully planted out at 5 feet apart in holes, it is quite unnecessary and wasteful to put four plants in a space of 2 feet, seeing that at some time or other three of them *must* be lost.

G. SPARLING,
Retired Deputy Conservator of Forests,
late of Jhelum Forest Division.

Dalhousie, 31st October, 1884.

—*Indian Forester*.]

SECOND FORECAST OF THE WHEAT CROP OF THE CENTRAL PROVINCES, IN SEASON 1885.

From J. B. FULLER, Esq., Director of Agriculture, Central Provinces, to the Secretary to Chief Commissioner, Central Provinces—Dated Nagpore, the 27th January 1885.

SIR,—In continuation of my No. C 160 A., dated 17th January 1885, forwarding a copy of a telegram despatched to the Government of India on the prospects of this season's wheat crop, I have the honor to submit a more detailed account of the condition of the wheat crop up to the middle of the current month.

2. As mentioned in my letter above quoted, the orders calling for the submission by District officers of a forecast on the 10th January did not formally cancel previous orders under which a forecast was due from them by the 15th January, and I expected that the forecasts for the 13 districts, from which none were received, dated January 10th, would arrive by January 15th. But up to January 20th forecasts were still outstanding for six districts, including the important ones of Nagpore, Raipore and Bilaspore, and I have been unable to include particulars for them in this return. Under the orders contained in Circular No. 39, dated 4th November 1884, the forecasts submitted in the middle of January were to be accompanied by reports from District Councils, but these have been received from only the two districts of Seoni and Betul.

Area.

3. Statistics of the area under wheat have only been received from one district (Hoshangabad) and the Deputy Commissioner distrusts their accuracy. Until indeed the reform of the village record staff has been completed, no area statistics of any value can be expected from these Provinces. General enquiries seem to show that there is a decrease in wheat area of larger amount than I anticipated in my first forecast dated December 19th last, and judging from the reports now received the area in the northern districts is less than the normal by from 15 to 25 per cent. The largest decrease is that reported from Wardha which amounts to 32 per cent. A special report on the causes of this has been called for. From the Districts of Chuttisgurh no reports have been received, but I do not think from what I have seen in the Raipore district that the decrease in area amounts to more than 15 per cent.

Outturn.

4. The late falls of rain have been of immense benefit. In the last week of December there was a fall ranging, roughly speaking, from 2 inches in the southern to half an inch in the northern districts. Since then more rain has fallen in the north of the Provinces, where more was needed. The district estimates show in many cases a substantial increase over those received in December. In Saugor only a two thirds crop is anticipated and in Hoshangabad even less than this. But these estimates are probably rather under the mark, and, speaking generally, an outturn may be anticipated of from 80 to 85 in 100 in the north of the Provinces and from 90 to 95 in the southern districts. Perhaps the best proof of the favourable character of present prospects is afforded by the fact that the monthly price currents which are received in my office from the towns of Jubbulpore, Harda, Nagpore and Raipore show that the price of wheat is very considerably less than it was after last year's harvest. The figures are as below :—

	PRICE PER MAUND OF 80 SEERS.					
	May 1884.			December 1884		
	Rs.	As.	P.	Rs.	As.	P.
Jubbulpore ...	1	11	11	1	9	7
Harda	2	1	4	1	15	4
Nagpore	1	12	10	1	9	10
Raipore	1	5	5	1	1	8

The high prices of last year may no doubt be attributed to the activity of the export trade. But the export of wheat has by no means stopped during the past three months. From October 1st and December 31st, 1884, the wheat exports of these Provinces amounted to 15½ lakhs maunds.

District.	Percentage by which area under crop exceeds (+) or falls short of (—) the normal.	Explanation of difference in area.	Estimated out turn in annas per rupee taking 12 annas to represent normal outturn.	Reasons for estimate.
Saugor	—20	The incessant rain prevented the preparation of the whole area. Its early cessation allowed the ground to harden before sowing time.	8	The crop is progressing favourably. The rain of the last week of December, and that which has fallen since has been of great benefit.
Damoh	—10	As above.	Not stated.	A good crop anticipated.
Jubbulpore	+ 5	The heavy rain prevented kharif sowings, but was favourable for wheat.	13	Prospects good. The recent rain has been of great benefit.
Mandla	...	No return received.	..	......
Seoni	—20	Same reason as given for the decrease in the Saugor and Damoh districts.	11	The seed was sown under unfavourable circumstances, and hence outturn is estimated as less than the normal. Prospects have improved lately.
Narsinghpore ..	—25	As above.	11	...
Hoshangabad ...	Not stated.	Area less than the normal owing to early cessation of rains.	From 7 to 10 annas.	Sowings have germinated well. Outturn estimated at seven annas in two out of the four tahsils, and at ten annas in the remaining two.
Nimar	+5 in one tahsil.	Wheat has been sown on land on which the autumn crops were ruined by rain.	12 in one tahsil.	The late rain has greatly improved prospects.
	+25 in the others.	......	14 in the others.	......
Betul	...	......	10 to 11	Estimate has been raised in consequence of late rain.
Chindwara	+ 2	......	9	The crop at first appeared poor, but has been greatly improved by the late rain.
Wardha	—32	Area has decreased owing to the abnormal character of the rainfall.	11	Estimate has been raised in consequence of the late rain.
Nagpore	...	No return recived.	...	......
Chanda	—15	Same reason as that given for the decrease in the Saugor and Damoh districts.	8	Germination has been unequal.
Bhandara	...	No return received.	...	......
Balaghat	—10 in one tahsil,	......	12	Prospects are good.
	+6 in the other.			
Raipore	...	No return received.		
Bilaspore				
Sumbulpore				

WATER FILTRATION.

Residents in the East have only too frequent opportunities of learning, by unpleasant, and even fatal experience, the dangers of impure water, and the advantages of perfect filtration. So many domestic filters are unfortunately merely so many delusions and snares, that their use positively increases the very dangers which they are employed to avert. The household water-filters until lately in use have generally been made of sand, coarse charcoal, or other similar material, cemented down or moulded into blocks. Now sand cannot remove the finest impurities, and neither can coarse charcoal; because the voids between the various particles of filtering medium are too large. The coarsest impurities are indeed arrested, but as in most of the filters alluded to, the filtering medium cannot be got at or removed by the householders themselves, the very impurities which are arrested are nursed and developed therein until the whole mass is teeming with life, which gradually finds its way into the filtered water chamber. Evidence of this appears when the water tastes mawkish, or flat, or when small white fliers can be seen in the filtered water; but long before this evidence is forthcoming, the filter has ceased to be anything but "a delusion and a snare." So-called charcoal blocks are not made entirely of carbon; clay, tar, and other coagulative materials are used to hold the charcoal together. Regular pores and channels are opened in the block during the baking operation, and the corks and glass fittings used with them are very often faulty. Moreover, the interior cannot be got at for cleansing, and this is a fatal objection to their use. You may blow through the block, the air will pass through the more open pores; but not through those that are choked with organic matter; you may scrape and brush the surface, you cannot remove the filth that is inside the block. It is not unusual to hear of such charcoal blocks being broken open, and found to contain live maggots and small red worms. Indeed, the writer on more than one occasion found maggots, &c., in the filtered water of one of these block-filters in India, notwithstanding that he frequently had the filter scalded out with boiling water. "But," says one maker, "my filters are self-cleansing;" "they require no attention," says another; "it will suffice to reverse the current," says a third; "or to blow through the filtering medium," says a fourth. Can anyone who has given the subject the slightest thought believe these extraordinary assertions? Break up one of these filters after it has been so "self-cleansed," and examine it. Often, a filter is left out of use for months, say in the absence from home of the family; it has, perhaps, been left partly filled with water all this time; judge what the condition of that filter must be when it is again being used, without having been taken to pieces, and without having had the filtering medium changed. A filter is like a dust-bin; it must be looked after and cleansed periodically. It is better to have no filter at all than to have one that you cannot or will not take the trouble of cleaning. We have of late years been told to boil the water we drink; but now Dr. Frankland says that "the germs which propagate epidemic, or zymotic diseases, may be boiled three or four hours and yet not be destroyed; they continue to exist in an atmosphere of cyanogen, they get on very well in sulphurous acid, in fact there are very few poisons which affect them." Cheerful news, very, to many of us, who in times of epidemic in the East have taken such care to have our water boiled! There is, therefore, but one remedy—it is to separate the germs, &c., from the water by a perfect system of filtration. To be perfect, a water filter must not contain any material which can communicate any injurious or offensive quality to the water which passes through it. It must remove from the water not only all the suspended matter—even the smallest bacterium or bacillum—but also organic matter in solution and inorganic matter in solution, such as iron or lead. It must aërate the water during filtration, and be so constructed that the owner himself can take it entirely to pieces, throw away the old filtering medium which has done its work, and replace it with a new charge with little trouble, and at a very small cost. Such are the qualities possessed by Maignen's patent "Filtre Rapide." To mark their approbation of this invention, the Special Commissioners, appointed by her Majesty's Government at the late International Fisheries' Exhibition, awarded a gold medal and two diplomas of honour; the Sanitary Institute of Great Britain, a special medal of merit, the only medal ever given by the Institute for filters; the National Health Society, a silver medal, their only award for filters also. This filter has been selected by the War Office for the Nile Expedition, both for the service of the boats, and for field hospitals. It has also received the approval of the French and Belgian sanitary authorities. The last pattern of Maignen's filters approved by the War Office is just the size of an old-fashioned watch, and can be used with an india-rubber tube to draw water from a pond or as a syphon, a more complete description of which we will give later on. Filters on the Maignen principle are made in all sizes from the "Tourist" and "Pocket Filtre Rapide," measuring 6 by 3¼ by 2 inches, and weighing, when full, 2lbs. 2ozs., or empty, 1lb. 2ozs., up to filters capable of supplying a town with pure water. We have not space to describe the construction and process of charging these filters; suffice it that they are strong, elegant, easily cleansed and easily charged, and above all things, effectual. For those who desire to obtain valuable information on water filtration, the reducing hard water to soft, and on water generally, as well as particulars on the various forms and details of construction of the Maignen filter, we would recommend a very readable pamphlet, entitled *Water, Preventible Disease, and Filtration*, by P. A. Maignen, and published by P. A. Maignen, 32, Mary-at-Hill, Eastcheap, London, E.C.

Apart from his filters, Mr. Maignen has introduced a most simple and effective means of softening hard water. Hard water is injurious for drinking, because its power as a solvent for the food is impaired, and because it is taken up by the absorbents of the stomach with much greater difficulty than a soft water, thus impeding digestion. It is a notorious fact that persons liable to gout or stone are well in soft-water districts, but they become very ill as soon as they go to live in hard-water localities. In making tea or coffee, cooking vegetables or stews, the difference between hard and soft water is very great. If tea be made with soft water it is much stronger and requires much less sugar than if made with hard water, thus effecting economy in both tea and sugar. Hard water is also very bad for washing. Each "degree of hardness" (*i.e.*, each grain of solid matter per gallon of water) causes the destruction of 12lbs. of the best soap by 10,000 gallons of water. With London water there is a loss of about 2lbs. of soap for every 100 gallons of water used before any portion of the soap can act as a detergent. This has led to the employment of soda and washing powders, which often spoil the linen, settling on it with the tenacity of a mordant, injuring both fibre and colours. In cases of diseases of the skin hard water is a veritable poison. Hard water produces the crust in kettles and boilers. It has been computed that 1-16th of an inch thick of incrustation causes a waste of 15 per cent of coal; ½ of an inch 60 per cent; and ½ an inch 150 per cent. This is a very serious item when coal or fuel is expensive. By throwing a given quantity (easily ascertainable) of Maignen's "Anti-calcaire" powder into the water, the lime and other matters are thrown out of solution, and they then subside, forming a stratum at the bottom, and the softened water can be run off from a tap placed a little way up the vessel's side above the deposit. This "Anti-calcaire" process can be applied in ordinary water jugs, or on the largest scale. For fuller details on this branch of the subject, we must also refer our readers to the above-mentioned pamphlet.—*Home and Colonial Mail.*

THE COOLIE RIOT IN TRINIDAD.

It is almost a matter of course that there should be wide differences of opinion here, in London, at least, about the causes which led to the collision between the police and the coolies at San Fernando, and who is to blame for the deplorable loss of life occasioned thereby, but, as the whole affair is still *sub judice*, and seems likely to be further investigated by a special commission sent out from home, we think our readers would do well to suspend judgment until these official inquiries have been completed. Mr. Quintin Hogg, Acting Chairman of the West Indian Committee, has done good service to the Trinidad planters, by promptly writing to the *Times* to point out that "there is no justification whatever for the attempt made to represent the riot as having arisen from any increase in the daily task, or in any reduction in the daily wages," and that the "insinuation that the riot arose from an attempt to interfere with the religious rites of the coolie" is equally uncalled for.

In the House of Commons, on December 4th, in referring to the subject, Mr. Ashley said that for many years the celebration of the Mohurrum festival had been attended with more or less disturbance among the coolies in Trinidad, collisions having taken place between the bands from different estates, resulting in bloodshed. In 1882 an ordinance was passed, based on a British Guiana ordinance, which is said to have worked well, under which in the earlier part of this year, regulations were issued by which the processions were forbidden to enter the towns of Port of Spain or San Fernando, or to use any high road without permission. It was fully explained to the Indian population that the regulations were merely intended to preserve order, and in no way to interfere with the celebration of their religious festival. Notwithstanding this, the coolies marched on 31st October, in large numbers, estimated at 1,000, armed with hakka sticks and cutlasses, and attempted to force their way into the town of San Fernando. The police were drawn up, with a small number of soldiers behind them, and the coolies continuing to advance after being repeatedly warned, the Riot Act was read, and the police fired. Thirteen coolies were killed and eighty-nine wounded. The Inspector-Superintendent of police stated that the police fired in self-defence, and in his opinion, and that of the officer commanding the troops, they would have been overwhelmed had they not done so. These are the facts as reported to the Colonial Office, but considering the great loss of life, the Secretary of State considers that an inquiry by an independent person will be desirable. It is important to note that the Colonial Office has no information of any discontent among the coolies in consequence of alterations in the scale of payments to them. From a table in the last report of the Protector of Immigrants it appears that less than half the coolies in Trinidad were under indentured contracts. Mr. Ashley is not in a position either to affirm or deny that the conditions of the contracts have recently been more strictly enforced, but he says he cannot conceive that there is any possibility of any breach of contract having been sanctioned.

To one point, however, we would call the attention of the public, and especially of those Members of Parliament who have constituted themselves the representatives of the West Indies. There has been no Governor in Trinidad for far too long a time, and no independent administrator since the death of Sir Frederick Barlee some months ago. Government has since been administered by Mr. Bushe, who was appointed Colonial Secretary of Trinidad no

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Crop and Weather Report.

[FOR THE WEEK ENDING THE 4TH FEBRUARY 1885.]

General Remarks.—Rain has fallen throughout the Punjab and the North-Western Provinces and Oudh, and in many districts in Bengal and in Assam. Slight rain has also fallen in places in the Central Provinces, in the Central India and Rajpootana States, and in Chingleput and Hydorabad, and in Tavoy in British Burmah.

Harvest operations continue in several district in Madras; the outturn is generally below the average. More rain is still wanted in Bellary, Anantapore, and parts of Kurnool; elsewhere prospects are reported to be fair. In Mysore the crops are in fair condition, but future prospects depend upon early rains. In Coorg the situation is the same as last week.

In Bombay the *rabi* harvest has commenced in places, and the condition of the standing crops is generally good. Scarcity of fodder and drinking water continues in parts of the Southern Mahratta districts.

The recent rain in the North-Western Provinces and Oudh and in the Punjab has been beneficial to the crops, and agricultural prospects are generally very favourable. In the Berar *rabi* prospects are good, and standing crops are progressing in the Nizam's territories. In the Central Provinces, the Central India and Rajpootana States, standing crops promise well.

The rain which fell in Bengal during the past week has improved the *rabi* crops generally, but has injured the prospects of the poppy crop in Shahabad and Sarun. *Amun* paddy has been nearly harvested, and the cultivation of early paddy has commenced in places. Gathering of the early *rabi* crops continues. Seasonable weather prevails in Assam, and lands are being prepared for the *aus* crop. Harvest operations have been nearly completed in British Burmah.

Cholera is abating in Coimbatore and Tanjore, and is prevalent in Prome and a part of the Amherst district of British Burmah. In other provinces, the public health is generally good.

Prices are generally stationary.

Madras.—General prospect fair, except in parts of Bellary and Anantapore.

Bombay.—*Rabi* harvest commenced in parts of Ahmednuggor, Sholapore, Belgaum, and Kaladgi; standing crops slightly injured by mildew in several talukas of Nassik, and by frost and small insects in parts of Poona, and cotton and tobacco in parts of Hyderabad; by frost cotton blighted in parts of three talukas of Dharwar and one of Belgaum; scarcity of fodder and drinking water continues in parts of the Southern Mahratta Country districts; cholera in parts of five districts; small-pox and cattle-disease in parts of ten, and fever in parts of fourteen districts.

Bengal.—Rain fell in many districts benefiting *rabi* crops generally; in some places it has to a certain extent injured *rahur*, linseed, and poppy; harvesting of *amun* paddy is nearly finished; cultivation for early paddy has commenced in some places; gathering of early *rabi* crops is going on; prices of food grains almost stationary; cases of small-pox and cholera are still reported, but on the whole the general health is good.

N.-W. P. and Oudh.—Rain fell in all districts during the week, doing much good; there was also some hail in places, but little injury was done; prospects continue favourable; supplies are sufficient and prices rule easy; the condition of men and cattle is favourable.

Punjab.—Rain throughout the province; health and crop prospects good; prices almost stationary.

Central Provinces.—The weather has become cooler during last three days; prospects continue favourable; health generally good; prices steady.

British Burmah.—Cholera prevalent in Prome town and in part of Amherst district, sporadic in five other districts; small-pox prevalent in towns of Thayetmayo and Henzada, sporadic in two other districts, otherwise public health good; cattle generally healthy; harvest operations nearly over.

Assam.—Weather seasonable: prospects of winter crops good; public health good.

Mysore and Coorg.—Crops in Bangalore and Toomkur districts in fair condition, but withering in parts of Kolar; prospects depend upon early rains; general prices show a tendency to rise; health generally good.

Berar and Hyderabad.—Weather cool and clear; cotton-picking and *jowari*-threshing continue; *rabi* plants progressing favourably; health generally good.

Central India States.—Wheat, gram, and opium crops are thriving; weather getting warmer; health good.

Rajpootana.—Weather has been changeable, but is now seasonable; health and prospects good.

Editorial Notes.

SOME time back we had announced that an Agricultural Exhibition will be held at Doomraon on the 17th, and four following days of the current month and from the prospectus published in the *Statesman* it appears to be a great success. It is a truism that the prosperity of a country depends on the development of its material resources; but while it is unfortunately the case that the whole Empire in India is living upon the soil, and that there is no satisfactory indication that India is increasing in material prosperity in respect of its handicrafts and manufactures, the circumstances of agriculture are in general so backward, that it has been calculated by no less an authority than Dr. Hunter, that forty millions of the population of India pass their days in chronic starvation. Many parts of the country are notoriously over-populated, and where this is not the case, the system of agriculture is of too primitive an order for the soil to return its proper yield The establishment by the Government of experimental farms in various parts of the country must be applauded, and equally the agricultural scholarships founded by Sir Ashley Eden; but the method to be kept in view is that which can be effected by the people themselves, and suited to their simple circumstances. It is a move in the right path when, under the intelligent direction of the Hon'ble Jai Parkash Lal, and a committee of the European officials of the district, the Maharaja of Doomraon has determined upon holding an Agricultural Exhibition. It is intended to exhibit every agricultural appliance in use in the Doomraon estates, every description of cereal and crop grown, and to illustrate the methods of cultivation, together with the domestic utensils, clothing, and home manufactures of the people. We shall thus get a view of the actual agricultural condition of the district. Agricultural improvements and appliances have been too much theorised upon; and the *desideratum* is every fact in connection with the cultivation of the soil, and the various indoor employments by which the cultivator enhances his means and comforts. It should be possible, with the knowledge acquired, to indicate to the peasant neglected sources of substantial profit, while it is of primary importance that those charged with the management of the Exhibition, should secure a chemical analysis of the soils on which the various descriptions of crops are grown. The cultivator has no idea of manuring, and it should be possible to ascertain what artificial compositions may best replenish the exhausted soil, without prejudice to caste feeling in this respect. We suspect that Mr. Nolan has had something to do with this Exhibition, and that we owe it to him that we are to have a great agricultural show, instead of another race meeting.

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THE Honorary Secretary, Agri-Horticultural Society's Gardens, Madras, lately wrote to the President of the Municipal

Commission, Madras, "requiring some small casuarina poles to repair damages done to trellis work, &c., by the cyclone, the Superintendent of the Gardens sent as usual to the casuarina plantations outside the town for what he required. Three cart-loads of poles, some very small, worth say Rs. 5 per cart load, were accordingly sent in and charged at the toll gate, Rs. 1-4, for each cart, in addition to the customary toll. If this charge be not a mistake, it appears to me to be most unreasonable. I understand it is the same rate as that charged for teak-wood beams, worth perhaps Rs. 100 per cart load, and which may last and be useful for a century, while such casuarina poles as we require for garden work last only a year or two at most. As we now require a further supply of thin poles for temporary barriers at the flower show, fencing, &c., I shall be much obliged for early information as to whether so heavy a tax as 25 per cent thereon is to be levied, to enable me to limit our requirements accordingly." The President in reply said, "that the rate of Rs. 2-8 sanctioned by Government under Section 341, Act I of 1884, is a rate per ton, and is not *ad valorem*."

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The irrigation returns of the North-West Provinces canals for 1883-84 show that the irrigation for the autumn crop exceeded that of the previous year by 65,000 acres, and for the *rabi* by almost the same acreage. The great demand on the canals was caused by the absence of winter rains, and a large area under inferior crops was irrigated. Even allowing this, the area of wheat irrigated in the year under review, compared with that of the previous year, was over 100,000 acres in excess. By reason of a large quantity of sugar having been left in the market, the unsold portion of 1882-83, less of the cane was sown. The returns of the working of the canals show a good profit, varying from 4·45 per cent on the Lower Ganges to 27·96 in the Eastern Jumna. The Agra canal succeeded, owing to the extent of its distributaries, in showing a profit of over 6 per cent. The total profit on all canals, on the capital outlay, amounted to 7·33 per cent. The last year, however, was an exceptional one, and it is not expected that a like satisfactory balance-sheet will be shown for the present year. The autumn and winter rains were both opportune and copious, and consequently, the demand for canal water has diminished.

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Messrs. Wm. Jas. & Hy. Thompson in their fortnightly circular say that upwards of 48,000 packages of Tea have been brought to the hammer during the fortnight, 1,700 of these being Ceylon Tea and 2,100 packages second hand and reprinted parcels. Considering the weight of supply and the unattractive quality of so large a portion of it, the market has shown strength and a healthier tone than in December, with more general buying by the trade; and where the teas offered have had special quality, the competition has been really good. The proportion of fine Tea coming forward, however, is small, and the improved prices paid for choice qualities—in some cases showing 2*d.* to 4*d.* advance—are fully justified. More attention is being paid to good Pekoes between 1*s.* 3*d.* and 1*s.* 6*d.*, which have been so depressed, and nearly 1*d.* recovery is quotable. There is also more enquiry for good liquoring Pekoe Souchongs and Brokens between 10*d.* and 1*s.* at rather better prices than have lately been paid. In common qualities, which unfortunately form the larger part of recent supplies, the movement has been adverse to sellers, demand having been insufficient to keep prices steady; leafy kinds, after selling lower than hitherto, close firm with more enquiry, but Fannings and Brokens show ½*d.* to 1*d.* decline from December rates upon grades between 6*d.* and 9*d.* and fully 1*d.* on broken Pekoes between 10*d.* and 1*s.* 2*d.* per lb. The estimate issued by the Association in Calcutta on the 5th instant is 60 million lbs., available for shipment to London. Upon this basis the receipts from all ports will be about 65 million lbs., against 63 million lbs. last year, while at the present rate of consumption the deliveries during the same period will be 67 million lbs., as compared with 60½ millions last season. These figures have begun to attract attention, but have not yet been appreciated by the dealers sufficiently to influence their operations. The shipments to December 31 were 51½ millions against 47½ millions last year.

One of the difficulties about ensilage has hitherto been the uncertainty whether the silage would turn out sweet or sour. But Mr. James Howard, M.P., by filling a 20ft. high brickwalled silo with mown clover, trampling it on the pile, and adding successive quantities of clover during two or three days, found that the mass heated sufficiently to destroy the bacteria which would have induced sour fermentation. Then by covering the whole with an air-tight roof, sealed by dipping into a water-joint or trough round the eaves, and without any weighting or pressure at all, he kept the silage sweet, good and fragrant, but slightly alcoholic in odour. By these experiments of Mr. Fry and Mr. Howard, we have now a silo under control, and not of a cost that will preclude its wide adoption.

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While on this subject, we might as well add that something new on the ensilage system has just been propounded by Mr. C. J. Johnson, of Darlington, who has proved the possibility of building any green food into open stacks, and by the application of screw pressure of converting it into excellent silage with only a very slight quantity of waste at the outsides of the stacks. It appears that on the hillsides of Kinross-shire, Mr. Parry Russell, by adopting Mr. Johnson's system, has made a 90-ton stack from *Juncus articulatus* which would otherwise have been entirely wasted, and the stack is so good that it has to be fenced off to keep the stock on the moor from it. If the expense of making silos can be saved, the ensilage system is likely to go ahead with still more rapidity than at present.

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A correspondent of a home paper writes to say that he has been an eye-witness to repeated experiments made by the late Mr. Andrew Crosse, in his laboratory at Fyne Court, in submitting milk to electric action, by which it was kept sweet for weeks together. The process is as follows:—"Two cylinders of sheet zinc and zinc iron are severally placed in two porous earthenware tubes, open at the top, closed at the bottom, the same being filled with water and connected at the top by a copper riband. The earthenware vessels are placed in the fluid (milk or other), and the electrical action immediately commences, and the fluid becomes antiseptic in a few hours. Milk has been kept sweet for three weeks by this process in the middle of summer."

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A home contemporary in an admirable review of home and foreign agriculture during the past year says, that the year just closed will long be memorable in the annals of agriculture as that in which excellent wheat in large quantities was sold at less than 30*s.* a quarter, a price unprecedented in lowness since the value of money has been anything like its present standard. During the last hundred years the low weekly average of 30*s.* 5*d.* per quarter, recorded for the week ended November 29, has never been approached; the lowest average for any previous weeks in the century having been 35*s.* 6*d.*, the price for the week ending Oct. 11, 1851. The year will also be noted in connection with one of the severest and most prolonged droughts on record. It has been a year, too, of alternate hopes and fears, culminating in general disappointment. When it opened, wheat and other autumn-sown crops were in a flourishing condition, after an extremely dry and mild winter. A few frosts in February gave a salutary check to upward growth, and a dry and sunny March further ensured the tillering and healthy root-growth of the young wheats. At the end of the month there was an abundant rainfall, which was very welcome in the light-land districts. Unfortunately, it was followed by a prolonged visitation of bitterly cold east and north-east winds with a few night frosts which gave a sickly hue to the wheats on the clays. The check to vigorous vegetation then given was in all probability the cause of such deficiency as was noticed in the wheat ears, subsequently, as the blooming time was particularly favourable, and there was nothing to account for the mischief in the climatic influences of the summer months. Thus it happened that wheat, instead of the great crop at one time expected, turned out to be only about an average one. Spring corn, on the other hand, improved so greatly as harvest approached that it yielded much better than could have been expected when, after being put in rather badly, it was nearly parched up by the drought of the latter part of the spring and the early portion of the summer. The hay crop was one of the lightest ever grown ; and the root crops did not yield an average weight, though they improved immensely towards the end of the season. Fortunately, the autumn was mild as well as dry, so that stock were kept out in the fields and pastures much later than usual, and the stores of the winter keep were thus economised to an extent nearly or quite equivalent to their deficiency. On the whole, farmers would have done pretty well if the prices of corn and meat had been equal to those of last year ; but all kinds of grain dropped in price, and meat sold so badly that graziers who bought lean stock in the spring at the high prices then prevailing, had little if any margin to pay for the summer's keep when they sold the animals, fat in the autumn. The crop in mutton was much greater than that in beef ; and, as wool continued to sell badly, sheep graziers suffered more severely than feeders of cattle. As for many years past, dairy farmers did better than any other class of agriculturists during the year 1884 ; for the abundance of feed during the genial autumn did much to compensate them for the effects of the summer's drought. It is to be feared that in the vast majority of farm accounts for the past year, the balance will be on the wrong side.

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The attention of the Government of Madras has recently been directed, by Professor W. T. Thiselton Dyer, of the Royal Gardens, Kew, through the Secretary of State for India, to the following extract from the *Journal of the Chemical Society* for November 1881 :—"Butter Beans," a new variety of fatty seeds, by F. V. Höhvel and J. Wolfraner (Ding'l ployt J. 252,333—337). During the last few months, fatty seeds of remarkable size have been brought into commerce by way of Marseilles and Trieste, consisting of the split embryo of endospermless seeds which belong to the *Vateria Indica*, a tree growing in India (especially Malabar), whence large quantities of vegetable fat (Malabar tallow) have been recently imported into Europe. The seeds are brought into the market in a decayed condition, the fruits being gathered triennially, and not as they fall from the trees. The seeds have an aromatic and bitter taste and a faint aromatic odour. Examined under the microscope, they appear to be made up of thin isodiametric parenchyma cells, the contents of which are composed of three ingredients :—(1) yellow hyaline or fine grained masses of albuminous bodies (protoplasm), insoluble in boiling alcohol ; (2) fatty substances, which are colorless, hyaloid, and crystalline, at places forming masses which, in consequence of the decay of the seeds, are quite separate from the *yellow* albumen ; (3) numerous starch granules (to the extent of from 15—20 per cent). The seeds of the *Vateria Indica*, when dried in the air, contain 49—21 per cent of a greenish yellow solid fat characterised by its agreeable, slightly balsamic odour. The fat resembles mutton tallow in hardness and viscosity, has a sp. gr. of 0·915 at 15° and melts at 42°. It consists of 81 per cent neutral fatty acid glycerides and trioleim, and 19 per cent free fatty acids. The fatty acids separate from the products of saponification, melt at 56·6°, solidify at 54·8°, and represent a mixture of oleic acid, and solid fatty acids melting at 63·8°, and constituting 60 per cent of the total weight of vegetable fat.

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We have been favoured with a copy of the Report of the Madras Agricultural College for the fifteen months ending the 30th June 1884, an arrangement adopted in compliance with instructions conveyed in the proceedings of the Director of Public Instruction of the 17th September last. The period under review embraces the 14th, 15th, and 16th sessions—two summer and one winter sessions. At the beginning of the period the names of 60 students were on the roll, and a fresh class was formed in October, which consisted of 34 students. At the end of the 14th session, seven students who had completed their course of training left the college. The number of students at the close of the period under review was 87—Europeans, Eurasians and native Christians, 8 ; Mahomedans, 12 ; Brahmans, 47 ; Sudras and others, 20. In addition to the students enumerated above, 16 probationers of the Cattle-disease Inspector's Department and two or three schoolmasters attended lectures in the college. The seven students who completed their course of training at the end of the summer session, 1883, obtained certificates as follows :—6 first class, 1 second class. Of the students on the roll at the end of the last summer session, 1884, 15 have gained first-class certificates and 4 second-class. The report consists principally of tables showing the name, age, nationality or caste, position of parents, approximate area of land held in family, educational attainments in entering the college, and the number of marks gained by each student during the session. The average age of the students is about 22, but there is one—a Eurasian, of only 15½, and another—a native Christian of 28. The statement showing the amount of land held in the families to which the students belong is very satisfactory indeed. While there are only nine families that have no lands, the possessions of the others vary from 4 acres to 1,100 acres, and in one case to 1,600 acres. The educational attainments of the students before entering the College are not generally very high, but four have successfully passed the F A. examination, and thirty-two the matriculation examination of some of the Indian Universities. There is one feature of the report which strikes us as being very useful, although not without precedent in the annals of educational records : we mean that portion of it which is occupied with examination papers. It acts as a land-mark for future students and a guide to them in their studies If this practice were followed in connection with University examinations, it would save a great many disappointments and failures. During the year under review, some changes took place in the staff of the institution. On the death in August 1883 of Honorary Surgeon Hamilton, F.R.C.S., Lecturer on Chemistry, Surgeon-Major Rogers, M.B., F.R.C.S., was appointed Chemical Lecturer, which office he continued to hold till the middle of June when his lamented death occurred. The former gentleman had been connected with the college since its foundation in 1876. The chair of Chemistry is now vacant. Other changes also occurred by the separation of the College from the Farm when Mr. Robertson was placed in the graded list of the Educational Department from the 1st of April last, and Mr. Benson, having severed his connection with the College, took up the appointment of Agricultural Reporter and Superintendent of Government Farms. We are glad to observe that physical training is not neglected in the College, and that gymnastics form a regular course in the educational requirements of the institution. An important branch of work is the Veterinary Department under the able management of Mr. J. Mills. We are told that the students take great interest in the practical lectures at the Veterinary Hospital, where they have had the benefit of seeing about 100 cases during the session. This enabled them to apply their theoretical knowledge—the all-desirable end in the teaching of Veterinary surgery.

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About a couple years ago a travelling agent from Arakan was touring through Bengal, for the purpose of gauging public opinion in regard to the introduction into the country of the indigenous earth oil. We believe his mission was not crowned with the success he anticipated, but he had our assurance that if a sufficient quantity of it could be raised, we had no doubt of the venture proving a remunerative one. Our predictions have not been doomed to disappointment. The report of the Borongo Company shows how successful it has been. *It is the largest worker of the wells, employing* steam machinery for sinking wells and pumping. The working staff consists of Englishmen, Canadians, Chinese, and Indian labourers. They have at present twenty-four wells, eight of which were sunk last year, the deepest of which is over 1,200 feet below the surface. Owing to want of sufficient pumping apparatus, only nine wells are regularly worked. Last year 234,000 gallons of crude oil were pumped, of which 65,450 were refined and the rest sold as they were. A great quantity of it finds a ready market in British Burmah alone, while Calcutta gets its complement, the refined oil, sold at 9*s.* per case, being cheaper than Devoe's American oil which sells at 10*s.* 6*d.* per case. The price of the crude oil is valued from 1*s.* to 8*s.* per maund of 11 gallons. The Arakan Company also started some works last year, and sank seven wells, the deepest of which was 400 feet. The five wells worked during that period yielded 107,800 gallons, which were all sold on the spot without being refined. Another and a third Company, known as the Petrolia Co., sank ten wells during the year, but no oil has yet been obtained. Natives have taken the hint from European enterprise, and have revived the industry which they carried on some years past. Although the machinery employed by them is rude and primitive, they have on the whole been very successful, and may be congratulated on their good fortune in having a good outturn for the small outlay. The entire quantity of oil raised in the district is given at 404,325 gallons. There are, however, some impediments in the way of a prosperous trade, such as the heavy cost of importing machinery, and the high rates of wages which obtain in the district, owing to its extreme unhealthiness. The difficulty of proper roads to the sea-ports is a great drawback in the expansion of the trade, but this, it is admitted, will not be permitted to remain long in the way of a healthy development of the industry.

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On the 28th November last, Mr. A. T. Arundel, President of the Municipal Commission, Madras, wrote to the Chief Secretary to Government:—"The bursting of the Red Hills Lake has removed one of the greatest difficulties in the way of a portion of the scheme for increasing and purifying the water-supply referred to in my letter, No. 1101, dated 4th September 1884, Financial Department; I refer to the laying of the new pipes through the bund into deep water, and the building of a water-tower in the deepest part of the lake. The execution of these works with the lake full of water would have been exceedingly difficult and costly. The recent unfortunate disaster has laid almost bare the site of the proposed work, it is necessary to take immediate advantage of the present opportunity and to commence the work without delay. Apart from the debateable details of the scheme there is, I believe, no question as to particulars of the work to be done within the bed of the lake. Colonel Hasted, before he left Madras, went fully into and approved the scheme which Mr. Jones desires to adopt. I beg, therefore, that the Government will be pleased to approve of the immediate commencement of the work to which I have referred. The cost will approximately be Rs. 36,020, and can be met out of the grant of Rs. 75,000 which the Government were pleased to bestow for this purpose. Mr. Jones, a copy of whose letter I enclose, has already discussed the matter with Colonel Prendergast. The work now proposed would be carried out subject to Colonel Prendergast's approval, and I am sure the Municipality may rely on receiving his co-operation, and that of the Engineer in charge of the lake."

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The following is from a note by the Chief Engineer for Irrigation:—"In paragraph 4 of Note printed with G. O. No. 1174, Public Works Department, 5th April 1877, the Chief Engineer for Irrigation detailed the improvements considered necessary to remedy the effective arrangements under which the town of Madras is supplied with water from the Red Hills tank: he considered that a better off-take should be selected and proper means for drawing off the water from the tank provided, and that the water should be raised to at least the level of the high ground near Mr. Ritchie's house, properly filtered, and conveyed by pipes instead of by an open channel to Madras. The Government, however, in their order considered that much investigation was necessary before it could be decided whether it would be preferable to let the water from the tank gravitate to filters near the town, the filtered water being afterwards pumped to the required level, or whether it should be pumped from the tank into filters placed at a convenient level near the tank. The subject has been duly considered and investigated by the Municipal Engineer, and approximate estimates have been framed by him for both schemes. I have examined the plans relating to both, and have no hesitation whatever in stating that it is in every respect better to raise the water near the tank, and convey it in pipes to Madras, than to convey it in an open channel to Madras, and there raise it. I consider an open channel for the conveyance of drinking water to be objectionable, and were it not so, the level at which the water would reach Madras to be filtered would be so low that there would be great difficulty in arranging the filters properly. There is no doubt that water should be drawn from the tank at a much lower level than it is at present, as in the famine year, irrigation had to be stopped, and then water had to be pumped up to the level of the off-take. The proper method of drawing off water is through a water tower so constructed that as the water-level falls in the tank, the surface water can be drawn till the tank is nearly empty. The whole contents of the tank will thus be available for the town supply instead of only a portion, as at present. I have lately examined the plans under preparation by the Municipal Engineer and approve of the general design of the water-tower, and would strongly urge that its immediate construction should be sanctioned while the tank is nearly empty; if the work is delayed until the tank fills again, there will be great difficulty in constructing the tower, and the cost will be very great. The tower should be built of the best materials, good brick and hydraulic mortar, and two iron pipes for drawing off the water should be laid in the masonry tunnel through the bank in the first instance, as any failure of one pipe would otherwise cause a stoppage of the water-supply." On the 20th December an order was issued by Government to the effect that the immediate construction of the tower was sanctioned, the cost being met in the manner proposed by the President.

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The recent visit of the Chief Commissioner of the Central Provinces to the Umaria coal-fields has been productive of much good. He has seen with his own eyes the capabilities of the coal-field, and the account to which it could be turned. The coal is not only handy, but of excellent quality. The railway to Kutni is being pushed on rapidly, and trains will be running by the next cold season. Coal should be landed at Kutni for about Rs. 4 per ton. Thus in the midst of two important railway systems where fine iron ore may be found in abundance, as well as limestone and manganese, the facilities for the manufacture of pig-iron are ample. If we are not mistaken, the Chief Commissioner has authorized to make some experiments in smelting which, in due course of time, will be made public. Here a great deal might be effected by private capitalists who could conduct the operations on a large scale.

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The results of the wine harvest of 1884 in Europe show that Germany has had the best yield, for more has been obtained there than in 1883, and the wine is also better in quality. All the other wine-growing countries have to register a falling off as compared with the previous year, both as regards quantity and quality. In Germany more than half a crop has been obtained, the quality being described as pretty fair. France has harvested less wine than in 1883, and its quality has, besides, not reached that of 1883. Spain and Portugal are in a similar position to France, for their 1884 wine harvest is less remunerative than in the preceding year, there being also a deterioration in quality. In Italy the yield is much less than in 1883, which is more particularly the case in North and Central Italy. The South of Italy has a somewhat better harvest, but the result on the whole is not so favourable as in the previous year. The quality of the 1884 wines of Italy is considered satisfactory; it varies very much, however, and is below that of the wines of 1883. In Switzerland very little wine has been harvested, and that little is only of medium quality. The deficiency, as compared with 1883, is considerable in every respect. In Greece, likewise, a falling off is recorded in comparison with the preceding year. In Austria about three-fifths of last year's yield of wine has been harvested, the quality being also, on the whole, worse than in 1883.

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Mr. B. D. Plummer, reported to the Directors of the Mysore Gold Mining Company, on "Mining Operations:"—"We have in hand the following works:—Sinking Taylor's shaft under the 173, the lode is mixed with branches of quartz, trap-rock, and arsenical pyrites, and is worth 1 oz. of gold per ton. The south end at the bottom of the mine is very hard to cut, and little progress is made. It is, however, a good strong lode, and will yield 10 tons of ore per fathom, the assay value of which is 3 ozs. 0 dwts. 10½ grs. per ton. The north end at the bottom of the mine is, if anything, tighter than the south end. It is a fine lode, 3 ft. 6 in. wide, worth 10 tons of picked ore per fathom, the assay value is 3 ozs. 0 dwts. 10½ grs. per ton. The winze in the bottom of the 173, on the west lode, continues tight to cut. The 173 north end on the west lode is at present suspended on account of the men quitting the company's employ. The air in this end is so bad, however, I do not now propose resuming operations until some better mode of ventilation is provided. There is nothing new to report from the 173 north end on the east lode. No. 1, 2, and 3 rises over the 173 are in good kindly looking quartz, the assay value is 11 dwts. per ton. The 135 north end has been in a good big quartz lode towards the bottom of the end, but just now it is almost entirely in old workings. We are getting on very well with the cross cut at the 173. We have, however, a good deal of timber to put in before we can start the proposed work on the lode. The machinery is in good working order."

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A HOME contemporary, writing on the subject of the growth and exportation of Indian wheat, says that it is, from the economical point of view, a real Asian mystery. Most of those who followed the evidence given last summer before Lord Kimberley's Indian Railway Committee must have been astonished at the magnificence of the visions of the future, which were described by the enthusiastic supporters of the rapid extension of locomotive facilities for the transit of grain. He who for the first time is told that it is feasible, under certain conditions, for India to supply with wheat, not only the whole of the United Kingdom, but also the cities on the eastern coast of the United States, at lower rates than those at which it can be sent from Chicago, is inclined to regard the statement as one of the "fairy tales of science." And it must be admitted that certain unquestionable facts would seem, on the face of them, utterly to demolish the optimist theories which were laid before the Railway Committee. The assembled shareholders of the East Indian Railway, for example, were told the other day that the recent falling off in the revenue of the Company was due to the fact that of late they had been carrying no corn to Calcutta for export to Europe—the result of the exceptional cheapness this year of English-ground corn. But now, again, we are informed by the India Office that the area of land in the North-West Provinces and Oudh alone under pure wheat cultivation this year is more than half-a-million acres over the normal amount, and 337,000 acres more than last year. It is not, however, impossible to reconcile the whole of these apparently contradictory statements. At the very moment when wheat is so dear at Calcutta, at Bombay, and at Kurrachee, that it would not be worth while to ship it, even if no freight were chargeable, to the Thames or the Mersey, there are practically unlimited lands within four hundred miles of these ports, where such wheat as is grown has to be completely wasted, simply because there are no railways by which it can be conveyed to the great trunk lines. It may, therefore, fairly be assumed that the Indian cultivators who are increasing the area of wheat-growing land are doing so in the expectation that the rapid extension of feeding railway lines will soon enable them to place a commodity, at present practically worthless, in the markets where it will command a remunerative price, even when placed in competition with European and American grown corn.

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A CORRESPONDENT writing to a Ceylon paper says :—Within the range of the limestone deposits, indeed, plants either of tea, cinchona, coffee or vanilla enjoy an immunity, and this fact attracting attention led to the employment of crushed or rather pulverized limestone, as a manure. One garden that had suffered so severely as to be on the point of being thrown up, was thoroughly renovated by the application of two pounds placed round the base of the stem of each plant. The cost of application being for an acre of tea, 2,722 plants, at a task of 500 for 3 annas, a little over a rupee per acre. If there is no limestone in the vicinity, the cost of getting it from Bengal would not amount to so much as the indulgence in those highly priced artificial manures at present in vogue. Lime is the most powerful renovator known (renovation must not be confounded with stimulation whose effects are transient.) Lime contains all the elements of strength-giving vitality, and, plants, so strengthened, will be as well able to encounter disease as a strong healthy man does. The puny effects from renovating pits filled with cowdung and weeds avail little, and cost three times as much as a seer of limestone would. It is unreasonable to expect that our plants of tea, coffee, cinchona, cinnamon, or other spices can go on standing the exacting demand constantly made on their leaves, berries, and bark without some corresponding nourishment as compensation, and though disease must be endured, our plantations must be strengthened to fight it, even, where it can be afforded, at the expense of abstaining for one whole year from growing a crop, after liming.

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THE following summary of the report of settlement operations for 1883-84 in connection with the cadastral survey of Kamrup will be found interesting :—The work devolving on the Settlement Department was the preparation of the new cadastral field-register in the place of the old mauzadari *dag chitha.* The plan followed was to get the new field-register (the *khasra* or cadastral *dag chitha*) written up on the field simultaneously and independently by the cadastral amin and the mandal or deputy mandal who accompanied him. On the area columns of the field-register (which were left blank at the time of writing) being filled up by the survey office, the settlement office proceeded to compile the *jamabandi* from it, and where discrepancies of an important character were found to exist between the new cadastral *jamabandi* and the mauzadar's *jamabandi* of the preceding year, spare amins were deputed with settlement munsarims to enquire into and reconcile them. The area covered by the cadastral field-to-field survey was 228·16 square miles, comprising nine mauzas in the centre of the Kamroop district north of the Brahmaputra. Besides this, 298 square miles were covered by the preliminary village-boundary survey, in anticipation of the field survey of 1884-85. The cost of the complete survey of the nine mauzas was Rs. 74,772, or Rs. 328 per square mile ; that of the additional 298 square miles of boundary work was Rs. 19,268, or Rs. 328 per square mile ; that of the additional 298 miles of boundary work was Rs. 19,268, or Rs. 64-10 per square mile. The survey ought to be able to work down to lower rates than these in 1884-85, but for a first season's operations they are not excessively high. The settlement expenses are shown as Rs. 17,128, but this figure does not agree with the Comptroller's calculations ; the difference is understood to be due mainly to the omission of the Extra-Assistant Commissioner's pay and travelling allowance from the settlement of accounts. The results attained within the period under review were the completion of the rough field-registers for the nine mauzas, and the preparation of corrected field-registers (after the enquiries by the amins and munsarims mentioned above) for a small number of villages. The process of correction is still going on, and the new cadastral field-registers will not be ready for use until 1885-86. This is slower progress than was hoped for, but the settlement (and, to a less extent, the survey also) had to contend with serious difficulties in the ignorance and apathy of the ryots, and the difficulty of procuring men who could be trusted to write the field-registers correctly, or to check them when written. The lesson learned from the season's work is the importance of getting a correct field-register in the first instance. No degree of apparently rapid progress can compensate the labour and delay subsequently entailed by the necessity of going over the same ground again, and correcting the mistakes of haste or carelessness. Attention must be paid to this point during the present season, and it is hoped that the cadastral field-registers of the mauzas surveyed in 1884-85 will be found to contain a smaller proportion of error than those of the first season of survey and settlement work, when everything was new, and the staff employed in the field were imperfectly acquainted with their duties.

EXPERIMENTAL STATIONS.

As the Local Government is about to organise an Agricultural Department in Bengal, it will not perhaps be out of place to give here a short sketch of the origin, scope and plan of the Rothamsted Experimental Station, the best of its kind in England, and, if not the best, at least one of the best in the whole world.

Mr. (now Sir) J. B. Lawes is the founder of this experimental station. He commenced experiments with different manuring substances, first with plants in pots, and afterwards in the field, soon after 1834. His experiments at first were not very systematic. In 1843 more systematic field experiments were commenced, a barn was converted into a laboratory. *The foundation of the station may be said to date from that time* (1843). The Rothamsted station has up to the present time been entirely disconnected with any external organisation, and been maintained entirely by Sir J. B. Lawes. He has further set apart a sum of £100,000, and certain areas of land, for the continuance of the investigations after his death.

In 1854-55 a new laboratory was built by public subscription of agriculturists and presented to Sir J. B. Lawes in July 1855. From this date, the old barn-laboratory was abandoned. The number of assistants and other helps was increased from time to time.

At first only one laboratory-man was employed, but very soon a chemical assistant was necessary, and next a computer and a record-keeper. During the last 25 years the staff has consisted of one, or two, sometimes three chemists; two or three general assistants. One of these is usually employed in routine chemical work, but sometimes in more general work. The chief occupation of the general assistants is to superintend the field experiments—that is, the making of the manures, the measurement of the plots, the application of the manures, and the harvesting of the crops; also the taking of samples, the preparation of them for preservation and analysis and the determinations of dry matter, ash, &c. These assistants also conduct experiments made with farm animals. There are now over 30,000 bottles of sample of experimentally grown vegetable produce, of animal products, of ashes, or of soils, stored in the laboratory. A botanical assistant, with 5 or 6 boys, is also occasionally employed to undertake the botanical work.

Two or three computers and record-keepers have been occupied in calculating and tabulating the laboratory and field results. One or two laboratory-men are employed.

Besides the permanent laboratory staff, chemical assistance is frequently engaged in London or elsewhere, and in this way for some years past, Mr. R. Ritcher, of Berlin, has been almost constantly occupied with analytical work sent from Rothamsted. The investigations carried on in the Rothamsted Experimental Station may be classified under two heads:—

(I.) Field experiments; experiments on vegetation, including investigation of soils, rainfall and drainage; botanical and physiological matters.

(II.) Experiments on animals; with supplementary investigations on the application of town sewage to different crops, and especially to grass.

SILAGE IN INDIA.

We have no such thing as pasture lands properly so-called in Bengal, neither is the peasantry in Bengal sufficiently informed of their usefulness. They will perhaps be surprised to learn that in England pasture lands fetch higher rent than arable—that while the average rent for arable land is Rs. 28 to 30 per acre, that for pasture is Rs. 35 to 40. But they will cease to wonder at it, if they are told that British farmers manure and look after their pasture lands with as much skill and care as their arable lands, and as a remuneration for the skill, care, and capital bestowed on them, they get more out of their pasture than arable lands. The pasture lands are partly grazed in summer by stock-cattle, sheep, horses, &c., and partly cut for hay, to supply fodder for stock in winter. The health of farm animals in winter is mainly dependent on the making of good hay in summer. It must here be clearly understood that hay is not mere dried up grass, as is understood by some in this country. It is grass cut in June and July when it is about to bloom, carefully cut, turned, and dried in the field, and ultimately carted, stacked, and thatched. Dry sunny weather is absolutely necessary for making good hay. The common saying "make hay while the sun shines" is nothing but the crystallized opinion of ages of British farmers on sunshine as an essential factor in the process of hay-making. But unfortunately for the British farmers, for the last few consecutive years, sunshine and good weather, during the time of hay-making, had been more an exception than a rule. To be independent of the sun in procuring winter fodder for stock has, therefore, lately been the aim of all intelligent British farmers. They are trying to introduce in their country the system of *ensilage* or *silage* making, long known and practised on the continent and in America. The system consists in making a reservoir called *silo*, in filling it with newly cut grass or any other green fodder crop carted directly from the field, and, ultimately, in covering it up in air-tight manner and having weights placed at the top to press the whole mass down. The grass is taken out of the silo after three months or any longer period, if necessary, and given to farm animals without any injury. While in the silo, the mass undergoes a certain amount of fermentation and other chemical changes, which render it into what is called *silage*. Whether silage is equal to hay in feeding property, or whether chemical changes and fermentation converting the green mass into silage, improve or deteriorate the feeding properties of the green fodder, are questions to be dealt with later on. For our present purpose, it is sufficient to state that cattle and horses take readily to silage; while sheep, indifferent to it at first, gradually get used to it, and seem to like it at the end. In most of the experiments where silage has been substituted for hay, and used as such, the results have been satisfactory.

It is high time for India, or better if we limit our area of observation and say *Bengal*, to benefit itself with the experience bought by the French, German, Americans and English, at the sacrifice of a large amount of money and a great amount of trouble. True it is that the condition of Bengal is very different from any of the above countries, but can we not adopt the system to altered conditions and circumstances? Our cattle suffer most for want of fodder in summer and during the rains. We have no proper pasture land, as we have said in the beginning, and the common or waste lands used as such generally get parched up under the burning rays of the summer sun. The cattle-men drive the herd to these waste lands to let them have their doubtful bite of dried-up grass. It is doubtful whether the cattle get sufficient to recoup their loss in going to and coming from the common lands which are usually situate at a considerable distance from the village. During the rains, some of the common lands get under water, while others remaining above water become difficult to reach, and even if reached would be quite insufficient for the number to be kept on them. During the rainy season there comes in another difficulty. The little paddy straw that the Bengal peasantry as a rule get after thrashing their corn, is used up by their stock during summer, and in covering their thatched houses, which is a periodical affair. So they have no dry fodder to fall back upon in the rainy season, as they have in summer.

It is of paramount importance, therefore, that we should lose no time in improving and extending, if need be, our pastures, and at the same time in making fodder reserves for use in summer and rains. The method of fodder reserve that seems to have a great future for India is the system of *ensilage*. Experiments on ensilage have already been set on foot by the Director of Agriculture in Bombay and in the Cawnpore Experimental Farm. The results of ensilage and experiments on feeding with silage, as given in the Bombay and Cawnpore Annual Reports for 1883-84 are very encouraging, though they are not yet sufficient in number and out-come of a long trial.

Miscellaneous Items.

SEVENTY bullocks are reported to have been frozen to death in one night recently in the Bolan Pass.

A CEYLON planter, who recently visited China and Japan, has brought back with him a collection of silkworm eggs, with a view to attempting sericulture in Ceylon. Former trials have shown the experiment to be attended with great difficulties.

THE Municipal Commissioners of Bangalore have rejected the scheme for diverting the Ulsur Tank, on the ground, that whilst the civil population might or might not benefit by such diversion, the military would. Water is promised the non-military section from a certain source, but the getting of it is a doubtful matter, as the opinions of professional men differ on this point. The Board demand that the promised supply be first guaranteed them.

AT a pleasant little evening party at Mr. Birdwood's, the Rev. Dr. Fairbank of Ahmednugger explained the structure and capabilities of his Eclectic Plough. From the account given, it appears to be a light but durable implement, well adapted to our soil. The plough is used first for loosening the soil, and then for turning it. Dr. Fairbank has used it on his own field which, we know, is the admiration of all who notice it, with success. We should like this model plough to be made known to our *kunbis*—it is cheap in itself, and needs only one pair of oxen to draw it.

SIR CHARLES TURNER, in the course of his address at the Veterinary College at Madras, the other day, said that there was no reason why Madras, Bombay, and Calcutta should be fed with indifferent mutton, and why the fleeces of the sheep should be inferior to those of Australia. If they carefully studied and realized the advantages of real veterinary knowledge, the food produce and the manufacture of articles would be considerably improved and add to the nation's wealth. The want of a knowledge of veterinary science allowed the destruction of large numbers of cattle.

THE experiments in growing and storing fodder in certain cantonments in the N.-W. Provinces, which owe so much of their success to General Sir Herbert Macpherson, are now about to receive the personal attention of the Commissary-General. Colonel Hunt, C.B., may be expected in Allahabad on or about the 21st, and is likely to be met there by Lieutenant-Colonel Burlton and Major W. G. Smith, Deputy Commissaries-General of the Lower and Central Circles, and Lieutenant-Colonel Badcock, C.B., from Rawul Pindee. The result of the conference should be a considerable extension of the useful operations already carried out.

A CONTEMPORARY hears by wire that the Bombay Exhibition will likely be postponed until the autumn of 1887. The Australian Colonies were asked whether December, 1886, or December, 1887, would be most suitable, and the replies generally favoured the latter year. America, it was also ascertained, could not exhibit in 1886, as she has an Exhibition of her own in London that year. Accordingly, a meeting of guarantors is shortly to be held to formally sanction the change of year. The Governor has promised to join the committee in London, and to come out to Bombay in a private capacity, so as to be present at the inaugural ceremony.

AT Pondicherry, the prices of many of the principal necessary articles of food have been at almost famine rates ever since the floods of December last, owing to supplies from the interior being cut off; even now rice is selling at 1½ Pondicherry measures only per fanam (equal to Rs. 8-4 per bag), and coffee at 8 annas per pound; vegetables, usually very cheap and plentiful, have often been difficult to get at any price. The French Minister for the Colonies has, we understand, sanctioned as an *interim* measure, an extraordinary expenditure by the Pondicherry Government, on account of the late inundations, of two millions of francs (Rs. 9,70,870).

PLANTERS in Ceylon seem to be too numerous yet, notwithstanding the increasing acreage of tea. One or two of the best Ceylon men have turned their attention to Perak where good tin ore has been discovered. Another Ceylon planter is at Rangoon, and about to make some experiments with cocoa in that neighbourhood. In this connection we may mention that Mr. F. N. Cabaniss, an American agriculturist, now in the service of the Government of British Burmah, has discovered indigenous grape in British Burmah, which in some respects resembles the native summer grape of Virginia. It grows very luxuriantly on either low, or rolling country, appears hardy, and is very prolific.

EIGHTY-THREE Javanese coolies, male and female, who had been engaged at Samarang by a planter for Deli arrived in Singapore recently by the British steamer *Normanby* from that port, and laid a complaint before the Netherlands Consul-General against their employer and a Malay assistant for forcible ill-treatment on board by branding them on the arm. The case was referred by the Consul-General to the Master Attendant, as the offence was committed on board a British ship, and a prosecution under under the Penal Code was pending before the Singapore police court when the last mail left. The defence is that the marking was only done with caustic, and that no force was used, and no pain caused.

MR M. A. LAWSON, Director, Government Cinchona plantation, &c., Nilgiris, reports that the total nett amount realised at the last three auction sales of cinchona bark was—28th July 1884—195 bales or 19,500lbs. of bark realised Rs. 20,444-12-2; 25th August, 112 bales or 11,200lbs. of bark realised Rs. 10,989-15-3; 17th November 1884—187 bales or 18,690lbs. of bark realised Rs. 16, 453-13-7: Total, Rs. 47,888-9,9. He proposes to sell the undermentioned number of bales and varieties of bark in February and March:—February 1885—20 bales Dodabetta Mossed Crown, 120 bales Dodabetta Renewed Crown, 60 bales Dodabetta Branch Crown. March—100 bales Dodabetta Natural Crown, 100 bales Dodabetta Mossed Crown. The Government has approved of these sales.

THE figures published in Messrs. Hart and Sibthorpe's *report* on the Indian Tea sales for the year 1884-85, regarding the business in London, ought to prove highly satisfactory to all owners of tea property in this country. We observe that the deliveries in January last were 6,390 000lbs., as against 5,610,000lbs. in the same month in 1884, whilst the stock in London on the 31st of January was 28,500,000lbs., as against 27,600,000lbs. The imports during January were only 7,770,000lbs., as compared with 9,080,000lbs. in January 1884, whilst the shipments from Calcutta to London in January were 5,254,000lbs., as compared with 5.287,000lbs. during the corresponding period of last year. This reduction in the imports, as well as the shipments from Calcutta, should certainly improve the strength of the London market, whilst the deliveries for the month are the largest on record.

THE causes of typhoid fever have still to be discovered and stated with authority; but both in England and on the continent, the prevalence of the disease is frequently associated with the existence of insanitary conditions, especially in connection with milk supply. Without in any way implying a connection between the two circumstances, we may point out that, in Lahore, where cases of typhoid occur periodically our milk-supply is largely obtained from sources which can only be described as filthy in the extreme, and utterly disgraceful to the authorities whose duty it is to see to the sanitation of the place. Cow sheds and native livery stables, in the most disgusting state, are allowed to exist in the very centre of the civil station; and in the city and bazaars, affairs are still worse. Local self-government may be a valuable aid in the political education of the people, but when its direct results are disease and death, it is time to protest.

PEOPLE in Paris are just now anxiously discussing a question which may be of much greater importance to France than any of the others at present exciting interest; for it refers to the saving of one of her chief industries, namely, wine-growing. A medical man in the department of Maine et Loire is said to have at length discovered a means of overcoming the phylloxera by an easy and inexpensive treatment, the basis of which is an arsenical solution mixed with cinders. The limited experiments made with this preparation seems to have been attended with admirable results. A vineyard selected from a neighbourhood completely devastated by the phylloxera, and subjected to the new treatment, resisted the scourge in a most striking manner. Not only the foliage and stocks, but the roots remained perfectly intact, while the fruit is said to have been abundant and of excellent quality. Further experiments on a large scale are about to be made in the Medoc; and, the inventor having patented his remedy, the result obtained will receive all possible publicity.

THE importance of the irrigation and navigation works on the Godaveri can best be estimated by perusing the figures published in the last report on the navigation of the canals for 1883-84. The mileage of the canals has been but slightly increased, that is, by only two miles, but as the number of cargo boats has decreased, the registered tonnage of them has lately increased, as has also the distance over which each ton was carried, but the value of the cargo has fallen considerably. Thus we find that the ton mileage amounted to 7,843,834 miles, which is estimated to have cost the owners of goods about two lakhs of rupees only, whereas by the ordinary means of carriage in the district, at the rate of 4½ annas per ton per mile, the cost would have been upwards of twelve lakhs. The value of the cargo conveyed is estimated at upwards of 126 lakhs, whilst the charge for navigation was only Rs. 63,414, or about 5 per cent. The return of the capital expended for the year is estimated at only 12·7 per cent, which does not seem a very large result for so much business.

THE *Pioneer* says:—"The further postponement of the Bombay International Exhibition we have regarded all along as, if not inevitable, at any rate advisable. An Indian and Colonial Exhibition at South Kensington, an Amercian Exhibition at Battersea, and an International Exhibition at Bombay—all within six months of each other—could not have failed to clash seriously. As it is, quite apart from the serious loss that the Bombay Exhibition would have suffered in competition with the English undertaking, the authorities of South Kensington will no doubt have quite enough to do with America, close at hand, without being further handicapped by the rivalry of fellow-countrymen in India. A second postponement is no doubt a double evil; but the suicidal competition originally contemplated would have been worse. The abandonment of the Australian Jubilee Exhibition for 1887 clears the way, and the liberal promises of assistance from London render the probabilities of genuine success much greater for an Exhibition at Bombay in that year than they would have been at the earlier date. In deciding to give due weight to the simultaneous wishes of London, Australia, and America, the organisers of the Bombay Exhibition will have taken the only wise course open to them."

Selections.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary Annual General Meeting was held on Wednesday, the 28th January 1885

W. H. COGSWELL, Esq., *President, in the Chair.*

COMMUNICATIONS.

FROM A. Mosley, Esq., Gibraltar, forwarding a small packet of Capsicum seeds and promising a further supply. Mr. Mosley mentions he would have been able to obtain all he wanted in the autumn, but the cholera scare prevented communication with the main land.

From J. A. Despeisse, Esq., of the Royal Society of Arts and Sciences, Mauritius.

"Dear Mr. Blechynden,—Many thanks for the parcel of timber seeds you sent some months ago to the Royal Society of Arts and Sciences of Mauritius.

Mr. Danetz, the Secretary, asks me to enquire from you what would be desirable for you to get at Mauritius? I send you, on behalf of our Society, four copies of her transactions, and shall have the pleasure shortly to send you four copies more which are in the press. Copies of your Journal are much sought for by us." Mr. Despeisse goes on to remark on the low state of the sugar industry through the great abatement of prices, and that he is interested in introducing new industries to the Colony. He asks for seeds of Cinchona, Divi-Divi, Chaulmugra, and such others as may prove useful, and hopes that the Hinglee tobacco seed already received from this Society will prove a success, and enquires regarding Mangoe grafts, and Indian Silk worms."

From F. St. C. Grimwood, Esq., Lakhimpore, Assam, forwarding a further supply of Muga eggs, in response to the Society's application to him. The Society's thanks are due to Mr. Grimwood for the prompt and courteous manner he has met the several similar applications made to him by the Society.

From H. H. Risley, Esq., Officiating Under-Secretary to the Government of Bengal, forwarding printed report on the competition of machines in the extraction of fibres, and the Lieutenant-Governor's Resolution thereon (transferred to *Journal.*)

ORIGIN OF THE FAZLI MANGOE.

An interesting communication from W. H. Irvine, Esq., of Bholahat, Maldah district, relates the origin of the well known Fazli Mangoe: "The name *Fazli* is a corruption of Phozir Bee, the name of the Mahomedan widow in whose *Bari*, of a few square feet, a mangoe seed thrown carelessly struck root and grew uncared for to a tree, till the flavor of its fruit gave a reputation to it which has made the poor widow's name known all over Bengal.

"The tree is supposed to be some 80 years old, but from the unceasing demands on it for grafts, it is quite a wreck.

"The Fazli Mangoe is esteemed above all others by natives, although by Europeans it is considered insipid and inferior to the luscious 'Gopal Bhog,' the Malda type of the still more delicious Bombay 'Mazagaon,' which general testimony goes to prove is its parent. Fazli mangoes are costly, and Rs. 50 per hundred is no uncommon price."

INTERCHANGES.

From Colonel Pollock, dated Pau, 24th December 1884:—

"I am in receipt of yours of the 7th July, which had been sent on to the Congo and returned to me here, where I am on sick leave, but return again next month. I am much obliged to you for the seeds sent to Captain Grant Elliott; will you kindly send the seeds, &c., I wrote for subsequently, to Vivi, Congo River, addressed to the Administrator General, International Association of Africa, care of Messrs. Hutton and Co., Liverpool? It would be better if they could be sent *via* Lisbon as a steamer leaves that port every month on the 6th for the Congo, but I do not think there is any direct communication between that port and Calcutta. It is the quickest route too, for the steamer from Lisbon takes but 24 days, whilst that from Liverpool takes six weeks.

I note your requirements, and I think I can meet them, not immediately perhaps but within six months, for all the best foliage plants are to be met with near the equatorial regions of the Congo. I have secured the Ice plant for you, and will return the Wardian case with it and other plants. Pray send us Tipparee, Dhall, Indigo, Morunga or horse-radish tree, Brinjal, Custard-apple, Assam or Burmese Orange seeds. I shall be glad to see the plants you have so kindly sent and promised.

We also should be glad to get seeds of the Musk Melon, Cucumber, and other plants of a similar nature.

Can you also send us Coriander, Ginger, Ajowan, Hibiscus Esculentus, Phaseolus Lunatus, Chunna or Cicer Arietinum, Rumex Vesicarius, Dolichos Lablab, Dioscorea rubella, Huldee, Cardamom, Kolee Seem, Kalee Tulsee, Kureela, Amaranthus Oleraceous, Sag, Pulwul, Bilimbi, Cashew Nut, Pummelo, Tamarind, seed of the plant that yields Gingelly oil, Paluk, Poppy, Kolemear, Fennel, &c., &c.?

The Congo has no delta and very little land excepting perhaps very far up, fit for rice growing. Mr. Johnston's knowledge of the Congo is very superficial, and his book not very reliable,—made to sell.

I know the species of paddy you mention very well. There was plenty of it in Burmah where I served for 13 years.

Our rains begin in December and end in June.

There are very few fruits. The Mangoe trees on the Niger bear a very fine fruit, better than any ungrafted ones I ever tasted in India, and the curious part of it is that the trees give three crops a year. I myself saw many trees loaded with fruit not quite ripe, but in full bloom also. I took a lot of the stones to the Congo, but not one germinated.

The Association has been recognized as a Sovereign Power by the leading European Powers, particularly by Great Britain, Germany and America.

With many thanks to the Society for their kindness in forwarding the plants and seeds.

The Association will have a vessel at Zanzibar shortly. I have written to the President, to write to you if he thinks his letter can reach you in time to send the seeds and plants that way. The B. I. S. N. Company's steamers ply from Calcutta to Aden, thence to Zanzibar. If you don't hear from the President, it will be a sign that the plants could not reach Zanzibar in time to catch their vessel."

It was resolved that the seeds, &c., asked for by Colonel Pollock be forwarded to him at an early date in the manner suggested; and that Col. Pollock be asked to obtain grafts or seed of the Niger Mangoo for the Society.

The Council's Annual Report was then submitted, as follows:—

During the year 66 members were elected and rejoined, a slight increase over the previous year and over 1882, the numbers in both having been the same (62); the resignations were, however, slightly more, 28, against 23 in 1883; in 1882 and 1881 the resignations were 38 and 55 respectively. In June last the President prepared and issued a Special Circular to the Proprietors, Agents, Managers, &c., of Tea Gardens, Indigo, Jute, and Cotton Factories, and similar industries, pointing out the many advantages to be derived from becoming a subscriber to the Society which had done so much to benefit the country during the last 64 years and which, with their united assistance, could do so more extensively still in the future. The result of his representation was the acquisition of a certain number of additional members, and doubtless the repetition of such a special appeal periodically will have good effect; for as old residents retire from India, it is essential to attract the attention of those who fill their places to the good object of the Society, as well as to the direct benefits it confers on members. The number of names removed from the list for non-payment of subscriptions shows an increase of one over 1883, 26 against 25.

The number of deaths are the same as in the two previous years.*

Owing to long absence from the country 20 names have been removed from the list, an increase over the previous year (11.)

The number of members on the list (576) are classified as follows:—*Life Members*, 30, *Honorary Associate and Corresponding Members*, 21, *and Ordinary Members*, 525. Of this number 37 are absent from India, and 43 have been non-effective in 1884, thus reducing the number of effective members to 445; the same number as last year.

The Council cannot pass over Sir Lawrence Peel's death without an expression of the great respect and esteem in which he was held by the Society, of which he was an Honorary Member since 1856, and had ever been a warm friend. A notice regarding Sir Lawrence Peel's death which appeared in the *Proceedings*, is reproduced in the *Journal.*

Flower Show.—For a variety of reasons the Council thought it inexpedient to hold the Annual Flower Show; they, however, encouraged their Malis competing at a small Show that was held within the Calcutta International Exhibition, where they gained one or two prizes.

Garden.—The Garden Committee have more than once reported favourably on the appearance of the garden and the internal arrangements; they consider the order, condition, and good progress reflect credit on the management.

There is now a very large stock of plants in hand, including Mahogany, Mango, and other Fruit Grafts, Roses, Crotons and other ornamental plants, although the distributions have been very large, 8.381 ornamental plants having been taken by members and 5,107 by non-members, or 11,488.

Of Fruit grafts 2,316 have been distributed to members and 349 sold to non-members, or 2,665 grafts. In all 14,153 rooted plants, exclusive of cuttings, have been sent out from the garden, against some 12,000 last year. Seeds have also been distributed independent of the usual allowance. During the half-year 645 packets of Vegetables, Flower, Ornamental Shrubs and Trees, Economic Plants, Fodder Grasses, &c., have been distributed without charge.

By the kind permission of Mr. Cloete, Executive Engineer, Presidency Division, the Society has been permitted to collect seed from the trees on the Maidan. There is now an useful stock of seeds ready for distribution.

In addition to the sale of 266 baskets of flowers, applications from Hospitals and Charitable Institutions for flowers, have met with ready response.

RICHARD BLECHYNDEN, JUNIOR,
Deputy Secretary.

THE WHEAT CROP.

THE following wheat forecast for the ensuing season in the Central Provinces, dated the 27th ultimo, from Mr. J. B. Fuller, Director of Agriculture, Central Provinces, to the Secretary to the Chief Commissioner, has been forwarded to us for publication:—

Sir,—In continuation of my No. C 160 A, dated 17th January 1885, forwarding a copy of a telegram despatched to the Government of India on the prospect of the season's wheat crop, I have the honour to submit a more detailed account of the condition of the wheat crop up to the middle of the current month.

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* *Deaths.*—Sir Lawrence Peel, J. S. Armstrong, Maharaja of Bettiah, Mrs. Munro, Preo Nauth Sett, J. Rayson, D. Steel, and R. B. Yates.

2. As mentioned in my letter above quoted, the orders calling for the submission by district officers of a forecast on the 10th January did not formally cancel previous orders under which a forecast was due from them by the 15th January, and I expected that the forecasts for the 13 districts, from which none were received, dated January 10th, would arrive by January 15th But up to January 20th forecasts were still outstanding for six districts, including the important ones of Nagpore. Raipore and Bilaspore, and I have been unable to include particulars for them in this return. Under the orders contained in Circular No. 39, dated 4th November 1884, the forecasts submitted in the middle of January were to be accompanied by reports from district councils, but these have been received from only the two districts of Seoni and Betul.

3. *Area.*—Statistics of the area under wheat have only been received from one district (Hoshungabad) and the Deputy Commissioner distrusts their accuracy. Until, indeed, the reform of the village record staff has been completed, no area statistics of any value can be expected from these provinces. General enquiries seem to show that there is a decrease in wheat area of larger amount than I anticipated in my first forecast, dated December 19th last, and judging from the reports now received, the area in the northern districts is less than the normal by from 15 to 25 per cent. The largest decrease is that reported from Wardha, which amounts to 32 per cent. A special report on the causes of this has been called for. From the districts of Chattisgurh no reports have been received, but I do not think from what I have seen in the Raipore district that the decrease in area amounts to more than 15 per cent.

4. *Outturn.*—The late falls of rain have been of immense benefit. In the last week of December there was a fall ranging, roughly speaking, from two inches in the southern to half an inch in the northern districts. Since then more rain has fallen north of the provinces, where more was needed. The district estimates show in many cases a substantial increase over those received in December. In Saugor only a two-thirds crop is anticipated, and in Hoshungabad even less than this. But these estimates are probably rather under the mark, and speaking generally, an outturn may be anticipated of from 80 to 85 in 100 in the north of the provinces, and from 90 to 95 in the southern districts. Perhaps the best proof of the favourable character of present prospects is afforded by the fact that the monthly price currents which are received in my office from the towns of Jubbulpore, Hurda, Nagpore, and Raipore show that the price of wheat is very considerably less than it was after last year's harvest. The figures are as below:—

	Price per maund of 80 seers.					
	May 1884.			Dec. 1884.		
	Rs.	A.	P.	Rs.	A.	P.
Jubbulpore	1	11	11	1	9	7
Hurda	2	1	4	1	15	4
Nagpore	1	12	10	1	9	10
Raipore	1	5	5	1	1	8

The high prices of last year may no doubt be attributed to the activity of the export trade. But the export of wheat has by no means stopped during the past three months. From October 1st and December 31st, 1884, the wheat exports of these provinces amounted to 15½ lakhs maunds.

5. A copy of this letter has been sent direct to the Secretary to the Government of India in the Revenue and Agricultural Department, and to the Secretary of the Bombay Chamber of Commerce. It will be printed in the next issue of the local *Gazette.*—I have, &c.

J. B FULLER,
Director of Agriculture.

WHEAT MEAL BREAD.

WHAT IS IT?

WHAT ARE THE ADVANTAGES OF EATING IT?

[By *Lady John Manners.*]

THIS question was asked frequently during the International Health Exhibition by those who visited the stall of the Bread Reform League. The same inquiries were put by many who attended the Exhibition of the League, held by kind permission of Mr. Humphreys, at his fine hall opposite Knightsbridge Barracks, in the last week of November.

I have been allowed by Miss Yates, honorary secretary of the League, to answer these questions from facts collected by her during a long series of years, and from other sources.

Wheat-meal bread contains all the nourishment of wheat; parts which are thrown away from white flour are kept in it. Granulated wheat-meal bread is especially valuable for children, for the poor who cannot afford much animal food. Many eminent physicians and chemists recommend its use to their rich patients, and it is a thousand times more valuable as a daily article of diet to the poor who cannot have the variety that those in affluence command in their fare. In white bread, as it is ordinarily sold, it is said the component parts necessary to form flesh and bone are not to be found. Professor Liebig tells us that whole-meal bread contains about 60 per cent more phosphatic salts than meat, and 200 per cent more than white bread. Phosphatic salts are essential to make bones and teeth. Whole-meal bread is certainly more satisfying than white bread; in fact, as a food, it somewhat resembles the oatmeal on which many of the finest and most athletic men in Scotland live principally, with the addition of milk. Miss Yates writes:—

"There are numerous examples of people being healthy and vigorous without ever touching meat, when their principal food is brown bread. I have already mentioned the Arab fellaheen, Turkish hamals, and Sicilian peasants whom I have seen myself personally. From friends I hear that the Hindoos of the North-Western Provinces can walk fifty or sixty miles a-day, with no other food than 'chuppatties,' made of whole meal, with a little 'ghee,' or galom butter. The Swedish, Norwegian, and Russian peasants live principally on brown bread. The French peasantry, at the beginning of the present century, lived on brown bread, and the working-classes of England have only generally adopted white bread during the last hundred years.

"In descriptions of rural life in England, I often recollect the brown loaf being mentioned, and the jug of delicious new milk. I fancy I smell the honeysuckles and the sweet breath of the cows, and hear the thrushes singing as the cottagers sit down to their supper at the little table on the red tiled floor. But, alas! I fear now white bread, not of the most nourishing kind, has long replaced the crusty brown loaf, and, instead of good draughts of pure milk, children and all have to drink tea, often without a drop of milk. If county gentlemen could give facilities for the poor to buy milk, they would do good."

Dr. Parkes, author of "Personal Care of Health," mentions that the entire grain of corn is badly represented by ordinary bakers' bread. He regrets that oatmeal is less used than formerly.

He tells us "that one-and-a-quarter pounds of oatmeal will supply as much nitrogen and almost as much fat to the body as one pound of uncooked meat of ordinary quality, yet the meat costs ten-pence per pound and the oatmeal only threepence or fourpence. For the same money a man gets nearly three times as much nourishment in oatmeal as in meat, and the oatmeal is more cheaply cooked."

Dr. Parkes adds that "a labouring man, by ringing the changes on oatmeal, maize, peas, and beans, rice and maccaroni, which is made from corn, to which may be added cheese and bacon occasionally, may bring up his children as well nourished as those of the richest people."

Attempts have been made to induce English people to oatmeal porridge, but I fear only the rich take to it. I find in Buckmaster's Domestic Economy that "in old times a peculiar sacredness was attached to bread. A house without it was said to be forsaken by the gods." This writer tells us that "white bread and new bread are wasteful," and that "our grandfathers and grandmothers ate brown bread often, barley bread and rye bread."

Most writers on food agree that we might be as well fed if we ate less meat, and more nourishing cereal food. It is in the belief that wheat-meal bread really does contain much valuable nourishment, that the Bread Reform League have united with Miss Yates in the effort to make its use more general, especially among the poorer classes.

For several years past, I have seen the whole meal or wheat-meal bread on the breakfast tables of the rich. I was told it was particularly recommended to those whose brains are kept in constant work.

I am greatly indebted to Messrs. Hill, of 59, Bishopsgate-street Within, and Albert Mansions, Victoria-street, for giving me information about the various kinds of meal. They sent me three samples of the wheat-meal flour, and some delicious "Devonshire bread." I learn from Mr. Neave Hill that the finest is wheat-meal—the sort Miss Yates advocates, is granular wheat-meal—and a third, the coarsest, is whole-meal. Twenty times as much is sold, by Messrs. Hill, of the third—the coarse whole meal bread, as others. This is eaten by the upper and middle-classes, as it is frequently recommended to those leading sedentary lives.

The only difference between the three classes of flour is in the grinding. The granular bread is smooth on the surface, and children profit much by its use. Messrs. Hill, with that benevolence and liberality which brings its own reward, have frequently endeavoured to promote the use of the whole-meal bread among the poor, even going so far as to offer it to them when one day old at the nominal price of one penny per 4lb. loaf, but they have not succeeded in popularising it among the classes to whom it would prove most useful.

If Messrs. Lockhart would sell it in buttered slices at their establishment, perhaps by degrees the poor would find out how good and satisfying it is. We must recollect that to the poor good butter is an almost unattainable luxury, and butter improves all three of those breads greatly. But as the granulated whole-meal bread certainly goes further than the white bread ordinarily bought, the money saved in the quantity of bread might be spent in a little more butter. The profits of the Bread Reform Exhibition were to be handed over to the Council to establish a *Penny Breakfast Fund for poor children.* At these *breakfasts it was proposed to give a thick slice of the granulated* bread and a cup of cocoa for a penny. The bread and cocoa certainly, together, make a substantial meal. I trust Miss Yates and the kind members of the Bread Reform League will not be discouraged if time must pass before the value of the food they advocate is generally recognised among the poor.

When Sir Walter Raleigh introduced the potato into England, in the days of good Queen Bess, he could hardly have foreseen that it would become universally used; and doubtless many at first objected to the foreign root, as some do now to the granulated and whole-meal bread. It is pleasant to think that many scientific men, many eminent physicians, and others, distinguished for their interest in their poorer neighbours, encourage this movement. Among these are Lord Shaftesbury, Dr. Richardson, Professor Tyndall, and many more.

All communications should be addressed to the philanthropic lady who devotes time and energies to promote the objects of the Bread Reform League, Miss Yates, 8, Northumberland Terrace, Regent's Park, England.

OPENING OF A SILO IN ABERDEENSHIRE.

Colonel Ferguson of Pitfour erected a silo last summer (under the able superintendence of his factor, Mr. Ainslie), on his farm of Lunderton. It was built as a barn, with strong stone and lime walls and a slate roof, and was divided into three compartments, each 15 feet by 14 feet, and 10 feet in depth. The partitions dividing the building into compartments were of stone and lime, 9 inches thick and plastered with cement. Drainage was amply provided for, and pressure on the ensilage was obtained by means of screws. Across each compartment were laid two old metal rails, a foot below the floor, and firmly built under the wall at each side. A strong concrete floor was laid above them, with holes in it to admit chains coming up from the rails below—one chain at either end of each rail about 3 feet from the wall. These chains extended up to the roof, and were fixed there. The ensilage, consisting of oats, peas, and beans, was packed into the compartments firmly, the chains coming up through it. When a sufficient quantity of ensilage was put in to fill the compartments, batons were laid across it closely, and over that transversely were placed two beams. Before coming up to this height the chains were attached to strong iron screws, which were taken up through the two beams we have referred to as having been laid on the top of the batons. To this a screw was applied, and, by means of it, the wooden cover was tightened down to a pressure of ten tons on each screw, or twenty tons on each compartment, equal to about 200 pounds on each superficial foot of surface. As the ensilage subsided, these screws were tightened. At the end of four days, when the subsidence had extended to three feet eight inches, the silos were opened and filled again to the top, salt being added in one of them at the rate of one pound to eighty pounds of ensilage. Each silo took in at the first filling twenty-three tons, which was the weight of crop grown on three acres of land. After the subsidence of four days seven tons more were put in, making thirty tons to each compartment. A large number of farmers were present on Saturday when the silos were opened, and they selected from the stock on the farm four calves, four cows, and four two-year-olds, to be fed on the silage for some time, and then tested as to what improvement had taken place in them.

THE FLOWER SHOW.

The Flower Show at the Agri-Horticultural Society's gardens, Alipore, on the 7th February, was as good as any of its predecessors, and we were glad to see that it included in it a Vegetable and a Fruit Show as well. There was not such a good exhibition of seasonable fruits and vegetables as one might have expected, or would like to have seen. This may be due, in some measure, to the difficulty in inducing native gardeners to a public show. There were, however, some fine specimens of potatoes, tomatoes, and onions. The knol-khols, turnips, cabbages, and cauliflowers were passable, though as good, if not better, specimens can be seen any day at the New Market. With the exception of *tiparee* (gooseberries), guavas, and *sapota*, there is a scarcity of fruits at this time of the season, yet we cannot say that (barring guavas), there was a very good exhibition of *tiparees* and *sapota*. The best collection of vegetables, to our thinking, was sent by Mr. Stalkartt; his show of tomatoes, potatoes, and French beans was the admiration of all. Generally, there was no good show of peas. As regards the flowers, the exhibition was, as we have said, as good as any of its predecessors, though we are inclined to think that the previous night's hail-storm must have contributed greatly to mar the show. There is not the least doubt that the roses suffered considerably from the storm, and we were not a little surprised when we entered the flower shed to see such a good exhibition as we did. There were some exceedingly fine specimens of cut flowers, and, as usual, Mrs. Apcar carried away the prize for the best stand of camelias. Baboo Prosono Coomar Banerjee, Roy Bahadoor, had a very fine mound of roses artistically arranged on a table, but, with a magnanimity becoming such an enthusiastic floriculturist as he is, he did not put these forward for competition. Belvedere carried away the prizes for the bridal bouquet of white flowers, and for the hand bouquet for the ball-room; while Baboo Prosono Coomar Banerjee was awarded the prize for the best bouquet of scented foliage. For the best collection of growing plants and flowers, Mr. S. P. Chatterjee obtained the Grant Silver Medal, and the prizes for both orchids and ferns were awarded to Mrs. Apcar. Mr. Chatterjee, who is a well known horticultarist, also obtained the prize awarded for crotons. During the afternoon, the Countess of Dufferin, Sir Rivers and Lady Thompson, his Highness the Maharaja of Cooch Behar, and the Raja of Sonbursa, visited the Show, when the band of his Highness the Maharaja of Cooch Behar, kindly lent for the occasion, played several selections. Owing to the uncertainty of the weather, there was not such a large gathering as is usually seen at these annual shows. Lady Dufferin left after a stay of about 15 or 20 minutes. Annexed is the list of the prize-winners :—

Growing Plants.—For the best collection of plants or flowers of any number of kinds, Grant silver medal, Mr. S. P. Chatterjee; camelias in flower, not less than 6 plants, 1st prize, Mrs. Apcar; ditto, not less than 3 plants, 1st prize, Mrs. Apcar; orchids in flower, 4 dissimilar kinds, 1st prize, Mrs. Apcar; ditto 2 ditto, 1st prize, Mrs. Apcar; roses, 12 dissimilar kinds, Belvedere, 1st prize: General Wilkinson, 2nd prize; 6 dissimilar kinds, Baboo Jadub Chunder Biswas, 1st prize: Eden Gardens, 2nd ditto; ferns, 20 dissimilar kinds, Mrs. Apcar, 1st prize: Mr. S. P. Chatterjee, 2nd prize; 10 dissimilar kinds, Mr. Larmour, 1st prize: Cooch Behar and Mrs. Apcar, 2nd prize; begonias, 24 dissimilar kinds, Cooch Behar, 1st prize: Mrs. Apcar, 2nd prize; 12 different kinds, Mr. Larmour, 1st prize, Cooch-Behar, 2nd prize; aralias, 5 dissimilar kinds, Baboo P. C. Banerjee, 1st prize; draccæas, 6 dissimilar kinds, Cooch Behar, 1st prize: Eden Gardens, 2nd prize: crotons, 24 dissimilar kinds, Mr. S. P. Chatterjee, 1st prize; 12 dissimilar kinds, Mr. Norman, 1st prize; 12 kinds, new and rare varieties, Mr. Seran, 1st prize: Mr. Bradley, 2nd prize; verbenas. 6 dissimilar kinds, Eden Gardens, 1st prize: Belvedere, 2nd prize; asters, Eden Gardens, 1st prize: Belvedere, 2nd prize; pansies, Belvedere, 1st prize: Eden Gardens, 2nd prize; phoxes, Belvedere, 1st prize: Eden Gardens, 2nd prize: petunias, Eden Gardens, 1st prize: Eden Gardens, 2nd prize; portulaccas, Belvedere, 1st prize: Eden Gardens 2nd prize; geraniums, Eden Garden, 1st prize, Belvedere, 2nd prize; violets, Eden Gardens, 1st prize: Belvedere, 2nd prize; foliaged plants, 10 dissimilar kinds, Mr. Larmour, 1st prize: Mr. S. P. Chatterjee, 2nd prize.

Cut Flowers.—Camelias, best stand of not less than 6 flowers, Mrs. Apcar, 1st prize: Baboo P. C. Banerjee, 2nd prize; best stand of not less than 4 flowers, Mrs. Apcar, 1st prize; Roses, best stand of 24 dissimilar kinds, Barrackpore Park, 1st prize: Belvedere and Baboo P. C. Banerjee, 2nd prize; best stand of 12 dissimilar kinds, Baboo P. C. Banerjee, 1st prize: Belvedere, 2nd prize; best stand of 6 dissimilar kinds, Mrs. Apcar, 1st prize; bridal bouquet of white flowers, Belvedere, 1st prize: Baboo P. C. Banerjee, 2nd prize; hand bouquet for ball-room, Belvedere, 1st prize: Mrs. C. R. Hill, 2nd prize; bouquet of scented foliage, Baboo P. C. Banerjee, 1st prize: Mrs. C. R. Hill, 2nd prize; heliotrope, the best stand, Mrs. Apcar, 1st prize: Mrs. C. R. Hill, 2nd prize.

Special Prizes.—Tree Ferns, Mrs. Apcar, President's prize; ferns, Mr. G. Norman, Mr. Larmour, and Mr. S. P. Chatterjee; foliage plants, Mrs. Apcar and Mr. J. Norman, President's prizes; best collection of foliage plants, Belvedere; ferns in glass-case, Mr. G. Norman; new heliotropes, Mrs. Apcar; medicinal plants, Baboos P. C. Banerjee and Aubinash Chunder Sen; table decoration, Mrs. C. R. Hill; orchids, Baboo P. C. Banerjee: dianthus, Eden Gardens and Baboo P. C. Banerjee.

FAIR TRADE.

[By Mr. W. J. Harris, M.P.]

There is at the present time a wave of doubt passing over the nation. The doctrines of political economy as taught in this country are being rudely assailed from many quarters. The agriculturists are holding meetings and passing resolutions in favour of a return to limited Protection. The manufacturers are loud in their complaints of the badness of trade. Working-men are resisting lower wages, thinking they can make laws for capital and keep their own position unassailed. The time is, perhaps, in this respect auspicious for such a subject to come to the front, in consequence of the large addition of voters from the wage-earning classes. The doubts that are permeating society will come more quickly to the front, and the next election may very possibly be fought out on the issue. Free Trade, as it is called in England, means that "we should take care of our imports," with the expectation that "our exports will take care of themselves." That is its only defence. We have chosen to be dependent on foreign commerce, while all other nations base their wealth on home development. Everyone acknowledges that between tradesmen reciprocity ought to exist, and it only requires to carry the idea a step further to feel that the same is true as regards nations. We are, however, told that our policy has enabled us to retain as our customers the non-manufacturing nations. The last year or two has shown that even this is not so. We are daily being shut out of our own old markets and our new markets are daily being more severely competed for. We are consoled by being told that the great continent of Africa is comparatively unexplored, and that we only have to be first in the field to have the custom of 200 millions of half-naked savages. Germany and France, at the same time, are plying the said half-naked savages with their own inducements, and, among many others, they will be able to urge that they did not kill four thousand of them in one day for no reason that has ever yet been explained. Where else are we to seek for new outlets? The moon offers us an unexplored market, but we can't get there; and even if we found the means of doing so, our competitors would quickly follow us. Under these considerations it is as well to turn back to the date when this policy was first recommended by the powerful voice of Richard Cobden, and see what reasons he gave for his belief in free imports. In a speech which he made in London on February 18th, 1844, he uttered these words :—

"The effect of a Free Trade in corn would be this: It would increase the demand for agricultural produce in Poland, Germany, and America. That increase in the demand for agricultural produce would give rise to an increased demand for labour in those countries which would tend to raise the wages of agricultural labourers. The effect would be to draw away labourers from manufacturers in those places."

Here are Cobden's reasons for his policy very clearly set forth; and, after forty years' trial, let us compare the actual result with what he foresaw. Germany is now underselling us in nearly every market in the world, and specially in our own. America sends us the corn but declines to take payment in our manufactured goods. In place of doing so she offers the inducement of her protected market to our best artisans and teaches her own people to make for themselves what Cobden thought she must buy from us. The trade between the two countries presents such extraordinary figures during the last eight years that they ought to be known by every voter in the kingdom :—

Imports of American produce from United States during 8 years, 1876-83	£732,000,000
Exports—British re-exports of *foreign* produce thereto	£235,000,000
	£497,000,000

One wishes that Cobden could rise from his grave and see these figures, and without being carried away with the cant of Radicalism, he would express his feelings that he would carry himself back to those eloquent speeches which he made, assuring us that "we only had to go the extreme length of admitting the labour of every foreign nation without let or hindrance, and that they all would follow our example within a very few years." Would he not say, "My children, my advice to you was good when you were so far ahead of other nations as you then were. You are now living under thoroughly changed circumstances. Use your brains as I used mine, but avoid prophecy. Your first duty is to see that your wage-earning population is in a state of progression, and not of retrogression. Remedy the most evident evils before you make radical changes. Bear in mind that every man in this country wants cheap food and full work. Know that in order to have the latter you are bound to import raw materials at their lowest cost. If your agriculture is failing, see how you can relieve it by relaxation of its unequal burdens before you proceed to tax the staff of life. Other nations know well your powers of retaliation; don't use those powers to the utmost until they have had complete time to reconsider the whole position."

Can it be construed into a wrong that we are doing to the great dead man to suggest that these might be his kindly words? If we thought it were, we would not write them; but Cobden was a man of great common sense, and, moreover, he was a man whose love for his country was greater than his attachment to party.

The real mistake we have made is to call our present system Free Trade at all. It is simply free import. Free Trade is free exchange. Free exchange will never be attained, for this reason, *viz.*, that it obliges nations to tax themselves unequally, and therefore the nation that had the smallest national debt and the fewest wars would in the long run win. If all nations were free from debt, and the millennium had arrived, free exchange would be far the happiest state for all. Next to free exchange comes reciprocity, and reciprocity we may obtain, first, with our colonies; and after that with other countries; but we shall never have it, if we shout from the housetop that we will never retaliate.

The first thing we have to do is to protect our own market. Fortunately, in doing this by a tax on imported manufactures, we help the poor without doing material injury to the rich. We encourage British manufacturers to endeavour to rival the foreigner in artistic design, and when once the start is made in superior workmanship, we can leave the rest to the talent of our countrymen. Goods will soon appear in our shops of English make, which will please and satisfy the rich as much as those made by the foreigner.

Economists tell us that the foreign workman will then compete with us more successfully in our own exported handicrafts. They forget that it is easy enough for the young English workman, with his improved education, to attain to the higher taste and higher class of foreign manufacture; but that it is not only hard but most distasteful for the foreign workman, who has been brought up to art-workmanship to descend to simple labour. Free Trade has denied to our artizans the higher class work, and left to us the lower class. We want both, and the attainment of both would not only secure employment for our increasing population, but would also raise their minds and educate their senses.—W. J. Harris.—*England.*

SHIPMENTS OF BULLION TO THE EAST.

The subjoined is from an annual Circular just issued by Messrs Mocatta and Goldsmid. Their statistics of the movements of the precious metals are valuable:—

"The silver market has again been characterised during the past year by remarkable steadiness for the first ten months, followed by a rapid decline in November and December, from which, however, in the last few days, there has been some recovery. The price, which at the end of 1883 stood at 51*d.*, fell in January to 50¾*d.*, but immediately improved, and on the 22nd February reached the highest point of the year—51⅜ per oz. Soon declining to about 50⅝*d.*, it remained between 50⅝*d.* and 50⅞*d.* with slight fluctuations till the end of October, after which a rapid fall took place until the middle of December, when the lowest rate—49½*d.*—was touched. This decline, which originated in the low exchanges in India, and the consequent reduction of the rate at which the India Council were willing to sell their drafts, became more marked on the announcement of the Secretary of the Treasury in America that another attempt would be made to suspend or repeal the 'Bland Bill,' which requires the coinage of silver dollars to the extent of two to four millions per month. The injurious effect of this report has to some extent subsided, as it is not thought that any action can be taken during the present Session of Congress, which extends to the middle of March next. The average for the year is 50 11-16*d.* per oz., differing very slightly from that of last year, which was 50 9-16*d.*

"The exports to India (£5,750,000) have been considerably in excess of those of 1883, which were under four millions, and large purchases have been made from time to time for Spanish account and for home coinage, which have supported the price of silver at times when there was a temporary cessation of the Indian demand.

"The bills of the India Council were taken freely in the early part of the year at rates ranging from 1*s.* 7⅜*d.* to 1*s.* 7½*d.*, but in the latter half the amounts taken were limited, the *minimum* having been kept rather higher than the state of business enabled the banks to pay. Lately, however, the *minimum* has been reduced to 1*s.* 7*d.* per rupee, and large sales made. The total since Jan. 1 is £16,066,000, against £19,500,000 in 1883.—*Home and Colonial Mail.*

THE POONA HORSE SHOW.

The following resolution has been forwarded to us for publication:—

Bombay Castle, 20th January 1885.

Letter from the Commissioner, C. D., No. R-5970, dated 28th November, 1884—submitting, with his remarks, a report by the Honorary Secretaries on the Horse Show held at Poona on the 30th September and 1st October, 1884, together with the report of the Judges of the Show.

Memorandum from the Commissioner, C.D., No. R-6195, dated 6th December, 1884.

Resolution.—Government in their Resolution No. 5955, dated 23rd June, 1884 sanctioned the proposal of the Commissioner, C. D., that the Poona Cattle Show should be held separately from the Horse Show. The reports now to be considered relate only to the latter show, which was held on the 30th September and the 1st October last.

2. It is satisfactory to observe that the show was better attended and more successful than that of the previous year. The number of animals exhibited in the Breeders' Classes rose from 192 in 1883 to 304 in 1884, the increase being evenly distributed throughout the different classes. There was, however, very little improvement in the condition of the animals exhibited, the only good classes being those of yearling colts and fillies. The Commissioner suggests, with a view to obtaining better results in return for so much labour and expense incurred by Government on horse-breeding operations, that castration of inferior stallions should be induced by levying a tax of Rs 5 on every entire horse that has not been passed by a Government Veterinary Surgeon. His Excellency the Governor in Council is of opinion that the practice of castrating horses unsuitable for breeding purposes, which is required in the interests of owners of horses, can be made popular only by convincing the persons interested of the advantages of it, and that it cannot be legitimately enforced in the manner suggested by Mr. Robertson.

3. There was an increase of 24 in the number (43) of geldings exhibited as compared with the number in the previous year, but little or no improvement in the quality of the animals. His Excellency the Governor in Council approves of the suggestion of the Honorary Secretaries and the Judges that in the classes for geldings prizes should in future be awarded to deserving animals only, and that the balance of the amount set apart for these prizes should be distributed, as considered fit by the Judges, among the unsuccessful exhibitors. The number of mules exhibited was 19 as against 15 in 1883, and that of mares used for mule-breeding, 11 against 9; but the animals looked in poor condition and of inferior quality.

4. There were in all 49 animals shown in the Fancy Classes as compared with 35 in the previous year The majority of the Judges propose that the prizes for these classes should be discontinued, with the exception of those for chargers. But the remarks made by the Honorary Secretaries and the Commissioner on the point show sufficiently the value of these classes in making the show attractive, and the Governor in Council concurs with them in considering that it would not be advisable to discontinue the offer of prizes for them.

5. The question of establishing a stud farm and purchasing on behalf of Government the best young stock exhibited is one for consideration in the Military Department, to which the papers forwarded by the Commissioner, C. D., with his memorandum No. R-6195, dated 6th December, 1884, and also the remarks of the Commissioner and Lieutenant-Colonel Hogg on the subject, should be communicated.

6. After defraying all expenses, which amounted to Rs. 7,236, a surplus of Rs. 734 remained in hand to be expended on the next show, for which the usual Government grant, Rs. 5,000, is sanctioned, with the concurrence of Government in the Financial Department, on the understanding that a portion of the grant will be set apart for expenditure on the cattle-show of 1885.

7. The thanks of Government should be conveyed to the Judges and to the Honorary Secretaries for the satisfactory arrangements made by them.

J. MONTEATH,
Under-Secretary to Government.

THE FALL IN PRODUCE AND RAW MATERIAL DURING 1884.

There is hardly an article of produce which has stood the pressure of over-increasing stocks and abounding protection. Sugar is from 30 to 40 per cent cheaper; coffee has declined nearly 20 per cent; tea, which had previously been declining in value for a series of years, has lost another 4 per cent or so; and wheat, which in December, 1883, had receded to 40*s.* per quarter, is now barely 31*s.* This represents a reduction in price of more than 20 per cent. In the case of raw materials, such as cotton and wool, the most important of all next to iron, the fall has not exceeded from 1 to 3 per cent, but then it is a reduction upon prices already low, so that the encouragement which the importer stood so much in need of has not been given to him. There is but one article, flax, whose price has increased by about 7¼ per cent since December, 1883, but all through the first half of the current year, it also was depressed. Hemp has declined about 6¼ per cent, jute about 21½ per cent, and raw silk 24 per cent. It has been much the same with metals. Iron, it is well known, has been low in price for several years, and steel was considered to be phenomenally depressed twelve months ago. No change for the better, however, took place during the first ten months of the current year. On the contrary, prices continued to shrink until Scotch pig iron touched 40*s.* and steel rails 45*s.* per ton. A slight indication of improvement has been visible within the last few weeks, and Cleveland bar iron alone remains at the lowest figure of the year. But notwithstanding this improvement, Scotch pig iron is still 4 per cent under the price of a twelvemonth ago, and the improvement in steel rails is little more than 3 per cent. As for other metals, the fall in some of them during the year has been nearly as disastrous as that in wheat or sugar. Chili bar copper has fallen 13 per cent in price in twelve months, and is now 27 per cent lower than it was three years ago. Pig lead has receded 12 per cent within the year, and Straits tin about 13 per cent. Little definite idea is, perhaps, given by statistics of the losses which this nearly universal shrinkage has thrown upon importers, and *data* complete enough to enable a correct estimate of the difference in money between now and a year ago do not exist. Were we, however, to assume that the imports of the country had lost in value only 5 per cent taken all round, it would mean that import merchants had received less by £16,500,000 for a like quantity of goods than they did during the preceding twelve months. This can scarcely be considered an excessive estimate, and a diminution of values to even this extent must have entailed wide-spread losses in that branch of business The internal trade and manufactures have suffered to at least as large an extent.

In the following table the quotations are given of the leading raw products where the changes have been most conspicuous within the past year—at three separate dates—enabling our readers to contrast the prices of last month with those current at the beginning of 1883 and 1884 :—

		1883. Jan. 7.			1884. Jan. 4.			1884. Dec. 4.		
		£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Wheat : Red Winter	per qr.	2	6	0	2	2	0	1	12	6
Barley (*Gazette* average)	,,	1	12	8	1	12	0	1	11	2
Oats (*Gazette* average)	,,	1	0	5	0	19	3	0	19	2
Potatoes	per ton	6	0	0	4	0	0	3	10	0
Rice (Rangoon)	per cwt.	0	6	10½	0	8	6	0	6	10
Sugar (West India)	,,	0	18	3	0	17	9	0	11	0
Coffee (Ceylon)	,,	3	4	0	3	12	0	2	10	0
Petroleum	per gal.	0	0	7	0	0	7⅜	0	0	6⅜
Tallow	per cwt.	2	3	6	2	2	9	1	15	3
Wool (Southdown hogs)	per lb.	0	1	0	0	1	0½	0	0	11
Do. (Sydney)	,,	0	0	11	0	0	9½	0	0	9¼
Hemp (Manilla)	per ton	49	0	0	42	0	0	40	0	0
Jute	,,	14	10	0	17	5	0	13	15	0
Silk (Cossimbazar)	,,	0	15	0	0	18	6	0	10	3
Copper	,,	60	10	0	57	5	0	51	5	0
Tin	,,	101	0	0	83	0	0	74	5	0
Lead	,,	14	10	0	12	6	0	11	2	6

—*Home and Colonial Mail.*]

THE IRON TRADE IN 1884.

DURING the year 1884 the movements in the iron trade have been less rapid than in many previous years, and have been shown more in the extent of production than in the price. There has been, it is known, a considerable reduction in the production—the decrease in the output in the Cleveland and Durham district alone being about 25,000 tons, whilst the statistics of the Scottish ironmasters show that there has been a declension in the number of the furnaces in operation in Scotland. Generally the tendency in other districts has been in the same direction, and when the official figures are compiled, a considerable reduction in the output will be shown from the maximum production attained in 1883. But prices have been fairly steady, especially in Cleveland, where a slight increase in the price in the early months of the year has been little more than counterbalanced by the fall in the later months, when shipments have been less, and when the stocks in the hands of the makers and in the warrant stores have been increased. The trade in all its centres has felt the effect of the diminished demand of manufactured iron for ship-building, which in the past four years has been one of the chief supports of the iron trade, especially in Durham. It is more in the direction of the home trade that the lower demand is known, so far as the crude iron trade is concerned, than in that of the foreign, for though the latter has declined, the fall is small compared to that of the former. In the Cleveland and Durham districts, for instance, the fall in the production of pig-iron of all kinds may be put at a quarter of a million tons, as we have said, but there is a more than equivalent fall in the consumption of that pig-iron for the production of malleable iron, and the decline in the quantity of iron exported is very slight. In Scotland, where a larger portion of the production is devoted to other than forge uses, the proportion is different, but there is generally a large sale of pig-iron to the United States, and from that country the demand has been small and dwindling all the year, until now it must be at about its lowest ebb. The hematite-producing districts of the north-west have also felt very seriously the loss of that market, but in the latter months of the year there have been slight and fitful signs of some recovery. In Wales, the dulness in the demand for steel has affected the crude iron market, and thus through the whole of the producing centres there has been, from one cause or other, a depression that has shown itself either in lessened production, or in increased stocks in the hands of the makers.

In prices, the movement in Scotland has been downwards in the year, despite the fact that the number of operative furnaces has been reduced by nearly ten per cent. At the beginning of 1884 the price of warrants was 42*s.* 10*d.*, and in the present year it has risen and fallen, the closing price being not very much below that amount; but there have been falls of more moment in the prices of iron of special brands, and had it not been for the collapse of several firms of "bears," the latest price of the warrants might have shown a fall more important. In the Cleveland and Durham district the steadiness of the price has been very remarkable, when it is remembered that the stocks in store and in the hands of the makers have shown a rather heavy increase. For January the average price was about 1*l.* 16*s.* 6*d.*, and it rose to its highest, 1*l.* 17*s.* 2*d.*, in March, and it has irregularly fallen by the end of the year to—for the last month—1*l.* 16*s.* It is long since the extent of the movement on either hand was so small as it now has been, and from that steadiness, some are inclined to draw the deduction that there will be an early increase in the price, one that will show itself when the demand begins to set in for the next shipping season.

But the position of the Iron trade as a whole depends much more on the demand from the outside than is recognised by those who hold that anticipation. It may be fairly believed that the worst has been known of the depression in the ship-building trades, and that there will be some increase in the demand for manufactured iron and steel for ship-building purposes; but we now make so much pig-iron that we need an outlet for a large part of our production in that form. We can scarcely hope for much immediate increase, though the stocks that are held by many foreign countries are very shrunken, and any return of activity in the trades would find them with their producing capacity much reduced, and they would have to draw to some extent on our stocks of raw iron. It is impossible to prognosticate the period of recovery of these foreign consumers; but as the fall has been sharp it may be hoped that the recovery will be speedy; and as the exports of crude iron have now fallen to a very low ebb, it is to be looked upon as a probability that the recovery cannot be very long delayed. All over the world the production of iron has fallen this year, and though the use of the crude iron may have decreased for a time, the actual consumption of the finished articles has gone on as usual, and shows that tendency to increase that is its normal attribute. More and more the fleets of the world are of metal; the area of the use of iron and steel on the railway is being constantly increased, and thus the quantity that is needed to replace that worn out grows from year to year. We cannot hope that the United States will for some months to come recommence railway construction on any scale of great magnitude, but in the East we ought to have a much larger demand—a demand that the rail mills of England should first be looked upon as likely to supply. With any recovery in our own ship-building yards, and with the enlarged use of iron and steel for repairs and renewals, there should be an accession of activity that would benefit the whole of the contributory trades. The manufactured articles are now at prices that must be looked upon as at the ebb, and these low rates should give an enlargement of the purchasing power of the users, whilst the belief that they are at their lowest will tend to bring into the market orders that have been kept back. The year 1884 has not brought down the price of crude iron much lower, but it has extended the low prices to plates, rails, and other productions, in which the declension is much greater than that of pig-iron in the year. Iron plates, for instance, are now lower than at any time the records show, and it is to that low price, in part, that the few orders for vessels that have of late been given out are due. In a degree, that remark applies to other goods; and already the effect of very low prices is seen in the closing of some mills that cannot work to profit at them. This will steady the market, and may in the end give the stimulus for which some branches of trade wait. Lessened production and a consumption that has a normal growth will in the end equalise themselves, and alter the course of prices, and the year 1884 has tended to produce that equalisation.—*Evening Standard.*

A SKILFUL SURGICAL OPERATION.

THE American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billroth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms :—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "*all gone*" sensation; a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow; the hands and feet become cold and sticky—a cold perspiration. The sufferers feel tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating,

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Crop and Weather Report.

[FOR THE WEEK ENDING THE 11TH FEBRUARY 1885.]

General Remarks.—Rain has fallen generally throughout the Punjab, Bengal and Assam, in Sind, and in two or three districts in the North-Western Provinces and Oudh. In British Burmah there has been rain in several places.

In Madras agricultural prospects are still bad in Bellary and Anantapore. Elsewhere in the Presidency the crops are in fair condition, but the outturn of the harvest is generally below the average. In Mysore prospects are fair, but more rain is wanted for the crops in the Kolar and Tumkoor districts. There is no change in the situation in Coorg.

In Bombay the *rabi* is being reaped in parts of Ahmednugger, Sholapore, Belgaum, and Kaladgi, and the standing crops are generally in good condition. In the Berars, the Nizam's territories, the Central India and Rajpootana States, agricultural prospects continue satisfactory.

In the North-Western Provinces and Oudh, the Punjab, and the Central Provinces, prospects remain unchanged.

The prospects of the *rabi* are generally favourable in Bengal, though in some districts damage has been done by insects. Reaping of mustard and pressing of sugarcane continue.

In Assam ploughing for *aus* cultivation is in progress, and the mustard crop is being gathered in two districts.

Cholera is abating in the Tanjore and Madura districts, but is increasing in Coimbatore. Small-pox is prevalent in several provinces. Otherwise the public health is generally good.

Prices are fluctuating in the Punjab; elsewhere they are generally stationary.

Madras.—General prospects fair except in parts of Bellary and Anantapore.

Bombay.—*Rabi* harvest in progress in parts of Ahmednugger, Sholapore, Belgaum and Kaladgi; standing crops injured by frost in parts of Hyderabad, by mildew in parts of Nasik, by rust and blight in parts of Shikarpore, and by insects in parts of Poona and Rutnagiri; scarcity of fodder and drinking water continues in several talukas of the Southern Mahratta country districts; cholera in parts of 6 districts, small-pox and cattle-disease in parts of 10, and fever in parts of 13 districts.

Bengal.—There has been rain in almost every district of the Province. It has generally benefited the *rabi* crops and facilitated the ploughing of lands for *aus* crops; potatoes have been injured in places where the rain was heavy; reaping of mustard and pressing of sugarcane are going on, and in some places the latter crop is being planted; prospects of *rabi* crops generally favourable, but in a few districts they are being damaged by insects; price of rice almost stationary; general health good, though cholera and small-pox prevail.

N.-W. P. & Oudh.—Blight and mildew present in some districts; prospects generally good; markets well supplied; prices easy; public health good.

Punjab.—Health and crop prospects good; crops in Rawalpindi tahsils threatened with blight owing to excessive rain; prices falling in the Hissar, Delhi, and Peshawur districts, rising in Ferozepore, and stationary in the remaining districts of the province.

Central Provinces.—There has been no more rain, but it is still cloudy in some districts; prospects continue favourable; prices are generally stationary; slight cholera and small-pox in places.

British Burmah.—Slight small-pox in Bassein, Henzada, Thayetmayo, and Mergui; slight cholera in Henzada, Thongwa, and Prome; elsewhere public health good; slight cattle-disease in Bassein; elsewhere health of cattle good; rainfall in Rangoon, Thongwa, Bassein, Pegu, Toungoo, Tharrawaddy, Moulmein, Shwegyin, and Mergui from 0·7 to 1·70 inches; elsewhere no rainfall.

Assam.—Weather cloudy; nights cool; mustard being gathered; lands being ploughed for *aus* cultivation; public health fair.

Mysore and Coorg.—In Kolar and Tumkoor districts crops suffering from want of rain, otherwise prospects fair; public health generally good; prices continue to rise.

Berar & Hyderabad.—Weather clear; prospects of *rabi* crop favourable; cotton-picking and *jowari*-threshing continue; wheat 22, *jowari* 26 seers per rupee.

Central India States.—Weather cloudy but much colder; prospects of crops and health good; prices steady.

Rajpootana.—Weather still continues cold; health good, and crop prospects good.

Letters to the Editor.

A PLEA FOR THE DATE PALM.

TO THE EDITOR OF THE PIONEER.

SIR,—Between 1869 and 1872, I distributed several varieties of seeds of the *true Arabian date palm* to all the district officers in Oudh. These seeds were sent by the Political Resident in the Persian Gulf at the request of the Government of India. Many of the palm which resulted from those seeds appear now to be flowering, and in the way of bearing dates. I therefore ask that you may be good enough to allow the following lines to appear in your columns, being the readiest way of diffusing information regarding the proper mode of cultivating this palm, and fertilizing its flowers. I consider this a very important subject. There is now a large number of Arabian date palms in Oudh, which, for want of sufficient knowledge about cultivating them, and otherwise dealing with them, are thought to be of little value. I need hardly mention that the flowers of the date palm are of two sexes, the male and female flowers being borne on *different* trees. The Arabian method of cultivation is this: Only female trees are planted, in large groves, the palms being put 12 or 15 feet apart. In order to do this, they plant only *offsets* (not seeds, as the sex of these cannot be known before they flower) taken from the foot of the female trees, when these offsets have attained the weight of three or four seers, that is, after five or six years or more of growth on the parent tree. I found September the best season for planting offsets in Oudh. They are then watered daily, or less often, till they strike, and afterwards at longer intervals. In the Persian Gulf groves consist of 80 to 200 palms. They should be protected from cattle; other crops can be grown between the rows; and there should be some means of irrigating the palms. In short, after striking, the trees should be treated in every way as other fruit trees, from which superior fruit is desired, each palm having a large *thala*, which should be periodically filled with a top dressing of any old manure available, such as cow, horse, sheep, goat, or even fish manure. Only the *decayed* lower leaves should be removed, and *none* of the green leaves should on any account be removed, as these are the lungs and stomachs of the trees. It should not be forgotten that fruit from offsets, if they are properly cultivated, will be like that of the parent tree, while fruit from *seedlings* will vary. Seeds can be sown in beds a few inches apart, and in a year, during the rainy season, transplanted into other beds, two or three feet apart, and finally planted out in groves 12 to 15 feet apart. The Arabs rely on *artificial* fertilization only to ensure a crop of dates. The male trees may be any distance, and may have flowered a month or two before the females. The Arabs say that the male bunch of flowers is mature when, by "pressing it, a faint rustling sound is elicited. Also, if a slit is made in the margin of the flower spathe, a peculiar odour is detected." Then the bunch of male flowers is removed from the tree, the spathe split open, the sprigs of male flowers carefully removed, and placed in a suspended basket, protected from draughts and allowed to remain 20 to 24 hours before being used. As soon as the *female* flowers have burst their enveloping spathe, they are fit to impregnate. The cultivator then climbs the tree, and inserts two or three male sprigs into each female bunch, and secures them with a strip of palm leaf. Date palms produce from 12 to 24 bunches of female flowers, but eventually only from *eight to twelve bunches of dates* are allowed to remain on each tree. If more are left, the dates, like other fruit, will be small, and many will fall off. They say that date pollen in this way will keep fertile for one or two months, and used as occasion requires. The male flowers should, however, be slightly moistened with water to prevent the pollen from being scattered too readily while being used. In the Persian Gulf artificial fertilization is considered a most important operation, otherwise the fruit is "abortive or blighted," without stones, and insipid. After fertilization the trees *are not watered for six or eight weeks.* I should wish now particularly to mention that in Arabia (and presumably in Oudh also) there are *three distinct classes* of date palms. (1) Such as do not ripen their dates beyond the red or yellow stage, firm and dry, called *kharek.* This occurs in June and July. The dates of this class can only be preserved by cooking or curing in other ways. (2) Such as turn brown, and become soft and juicy, but go no further. This occurs in August. These dates are called *rutub. Even in Arabia* this class of dates will not keep *beyond a few days,* as they turn sour. They can only be made to keep by proper curing. (3) Such as go beyond the *rutub* state, and ripen thoroughly into the *khorma* stage, which is sweet and semi-dry. This complete ripening in Arabia occurs in September. It is this last class of dates, which, after being collected and exposed in the sun, to rid them of their extra juice, are carefully packed in boxes and exported to Europe and America, without any further preparation. It should not, however, be forgotten that *khorma* dates have, of course, to pass through the two previous stages, namely, of *kharek* and *rutub.* All the classes of dates, at *all* stages, are edible and nourishing, and the Arabs feed on the one or the other kind all the year round. The shrivelled, unripe droppings, or such as are *not fertilized,* and therefore *insipid,* are given to goats, sheep, and cattle. In the Gulf, there are upwards of a hundred varieties of date palms. And, as something like fifty varieties of date seeds were sent to Oudh, there are sure to be in almost all the districts many puzzling classes and sub-classes of date palms. In the Lucknow Horticultural Garden alone there upwards of 252 seedlings, varying from 13 to 16 years old; and 112 from imported offsets, from 12 to 13 years old, and I am informed that there are hardly two alike. In the districts there are only seedlings of the foregoing ages. Unfortunately, however, those in the districts are scattered, and unless artificial fertilization be practised, little will be known of their worth. The male flowers of the *khájoor,* or jungle date palm, are as good as any for purposes of fertilization, but the plants resulting from such crossed seed, would be mongrels, although not improbably very good mongrels. With regard to protecting the ripening fruit from the depredations of bees, wasps, birds, and squirrels, the Arabs do little. Their plantations are on an immense scale, and the loss from these causes they consider unimportant. Sometimes they envelop the ripening bunch of dates in the leafy branches of some bush, sometimes in bags made of date-leaf matting; but where very choice varieties are grown, and the number of trees is small, they cover each bunch with a gunny bag. Squirrels in India are a great nuisance, and would tear the gunny bags and use the fibre for making their nests. Thorny branches of *babool* and *bair,* tied round the palm stems, would, however, prevent them from getting up. I will not further take up your space with detailing the different recipes for preserving and curing the different kinds of dates. I shall only give the names of the preserves, and shall be glad to give further information to any one wishing to know more about them. They are the following: *Khorma* (such as are exported to Europe), '*khorma sheerub,*' '*khorma sub-rozd,*' '*khorma post kandah,*' '*morrabba khorma,*' '*matgoogale,*' '*kharek pokhta.*' As stated before, the *kharek* and *rutub* kinds cannot be kept, except by cooking or curing them in various ways. I have written all this because I think the introduction of the date palm a most important matter, Of all the trees that have been introduced, with the view of providing something edible in famine times, this I think is the one which promises most. In Lucknow the best and finest crop of dates was produced *when there was a scarcity of rain* in 1878. In that year very little rain fell before October. The date fruit appears to have all the ingredients for nourishing the body. We have been told that during the late Russo-Turkish war, the Turks marched and fought upon no other food. Poor Arabs live upon little else, and feed their camels on the same. In addition to food this wonderful tree affords materials for baskets, mats, and bags, and hats and caps, for hutting and thatching, and for fuel, and also a fibre for ropes, and timber for various purposes. In case of need, and at the expense of the fruit, it will also provide sugar, molasses, and spirits. Although in some parts of India, owing to excessive rain at the ripening time, the dates may not come up to the *facile princeps* of their kind—the *khalas* date of 'El Hasa'—there remains no doubt whatever that under *any* circumstances the palm can furnish abundant food of a very valuable kind, as far as nourishment is concerned, and that it is the best tree that can be introduced for famine times. I was told at Lucknow that one of the bunches was *ek-admi-ka-bojha.* Groves of such palm in times of scarcity would be far more valuable than mango groves, as what is not eaten at once can be readily cooked and preserved for future use. The age of the date palm is, I think, unlimited, and unless blown down in storms, when they are singly placed, they go on fruiting for ever. As there are now some of these date palms in almost every district of Oudh, they are very valuable as centres of dissemination *if the flowers be fertilized.* They can be multiplied both by offsets and by seeds. Although the latter might not, perhaps, reproduce the exact qualities of their parents, it is well known that they produce useful and often valuable varieties. Of course a few trees are of little value except for propagation, but hundreds of thousands of date palms would certainly be of *immense* value.

E. BONAVIA, M. D.

Etawah, 7th February.

Editorial Notes.

According to a contemporary a company, called the Cairns Tobacco Co., have for some months past been quietly proceeding with their plantation on the Barron river and with marked success. Operations were commenced shortly after the conclusion of last wet season, when about four acres of land were cleared and planted as an experiment; the best Virginia seed, Oronoko, and Hester alone being selected wherefrom to raise plants. These, when planted out, were placed 3ft. apart, and have yielded eighteen to twenty leaves of an average size of 3ft. 4in. long by 2ft. wide per plant, which gives an average of a ton and a quarter of tobacco per acre, the yield this year from the four acres planted being nine to ten tons. As soon as it was found how well the plants thrived, a drying-shed of galvanized iron 70ft. by 40ft. was erected, and machinery for the manufacture of the raw material ordered from Sydney, the latter of which is only just coming to hand. Samples of the tobacco have, however, been forwarded to Sydney and Brisbane, where it has been pronounced by experts to be of the finest quality, and valued at from £70 to £80 per ton for dry leaves, at which price the Company have received an offer to take their crop. The kinds of tobacco proposed to be manufactured on the plantation at present are the usual twist, cake, and cut tobaccos, and it is anticipated that the Company will very shortly be in a position to offer tobacco of their own manufacture in the market. The success that has attended their experimental efforts has determined the Company to prepare for more extended operations, and next year cultivation will be proceeded with upon a much larger scale.

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Of the entire products of the vegetable world there is, perhaps, none which can compare favourably with the cocoanut palm in the variety of uses to which it can be converted for all the ordinary purposes of life. The period during which it yields its fruits is the same as that allotted to the life of man—three-score years and ten; after this it ceases bearing. The trunk is then cut down, which is utilised by the peasant for building his hut and the cow-shed, and the leaves are used to thatch them, slips of the bark are used as bolts and bars, and the leaf stalks are used to fence the little plant of chillies, tobacco and pine with which his habitation is generally surrounded. A rude net of coir strings made from the husk in which the fruit is enclosed answers the purpose of a bed in which the infant is swung to sleep, the meal of rice and scraped cocoanut is boiled over a fire of cocoanut shells and husks, and is poured into a dish of the plaited green leaves and eaten with a spoon scooped out of the nut shell. When the peasant goes on a fishing excursion at night, his net is of cocoanut fibre; the torch that lights his way and helps him in his labour is a bundle of dried cocoanut leaves and flower stalks—his little canoe is a trunk of the tree hollowed out by his own hands. When thirsty he helps himself to the juice of the young nut, and when he is hungry he eats of its soft kernel. If he wants to take a cup that cheers him up and is slightly inebriating, he quaffs a little of arrack distilled from the fermented juice of the palm, and if inclined for a dance he does so to the accompaniment of rude cocoanut castanets. The very toddy which he takes to drive away weariness yields him vinegar wherewith to flavour his curry. The oil made of the kernel acts as a remedy against the cold, and is therefore well rubbed all over the body to preserve vitality, infants especially being well besmeared with it, and exposed to the rays of the sun to fortify them against variable climatic influences. A coarse description of sugar or jaggery is manufactured out of the kernel, which goes to flavour his coffee, and the milk of the nut does duty for that of the cow. The very lamp which lights his hut is made of cocoanut shell, and fed with cocoanut oil. The few rude furniture of the peasant's habitation, the very doors, windows, shelves and chairs, are all made from the wood of the tree. His spoons, his forks, his basins, his mugs, his salt-cellars, his jars, his child's money-box—are all derived from the same source. Over his couch, when born, and over his grave, when he has done with the world, a bunch of cocoanut blossoms is hung to charm away evil spirits. The proverb that "the cocoanut palm has ninety-nine uses, and the hundredth cannot be discovered," is nothing but the crystallised experience of hundreds of generations.

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The drug known as Papain, the active principle of the *carica papya* and its valuable properties, have for the past some years attracted a good deal of attention from the members of the medical profession all over Europe. The following notes by Professor Finkler of Bonn who has carried out some careful experiments with it will be very interesting to our readers. He says :—I have for several years turned my attention to the chemistry of digestion and ferments ; it was, therefore, only natural that I should take an interest in papain, which I find dissolves albumen and fibrine in acid, alkali, and pure water. I test the whole of the papain in my laboratory, and I guarantee that it will dissolve in pure water 1,000 times its weight of fibrine. This preparation is different to any other I have tested, because it is not acted upon by exposure to the atmosphere, and will keep for some time. Papain dissolves the membranes of diphtheria and croup very rapidly, not a single patient that I have treated in the University Hospital or in private practice has died, but all have recovered. In every case the membrane was dissolved, by painting it with papain about five times a-day. In very severe cases, I have continued the application during the second day. I found that as soon as the membranes were dissolved the fever disappeared, and the pulse became normal. Dr. Rossbach, Professor of the University of Jena, a very distinguished physician, has had the same results. It is evident that the danger of diphtheria is due to the membrane, and if this is destroyed the danger disappears. As papain can be applied with salicylic acid, which increases its action, I maintain that there is no other drug in existence that has equal properties for this purpose. When using papain to paint the membranes caused by diphtheria, I mix 0·2 grammes* of papain in 2 grammes of water ; this is sufficient for application. I never mix more than the quantity of papain required for the one operation, as it appears that papain loses somewhat of its power if allowed to dissolve for any length of time in water. Therefore after three hours I prepare a fresh solution for application. Papain cannot harm either the stomach or bowels. I have taken it myself in doses, 0·1 to 0·2 gramme (1½ to 3 grains), I have prescribed papain to a great many of my patients affected with disease of the stomach, but I have never known any bad effects. Even an atonic and also an anæmic stomach can take it without the slightest ill-effects. On the contrary, an increased appetite is soon observed. Papain dissolves the mucus and cleanses the stomach effectually. It is not correct that papain dissolves the lining (mucous membrane) of the stomach. I have given it to animals, and have observed, after having the animals killed, that the mucous lining of their stomach was sometimes slightly reddened. If, however, papain is given directly after meals, when the stomach contains food, I have never noticed a change in the appearance of the stomach. Acidity of the saliva is in most cases a consequence of deranged digestion of the stomach ; by taking papain, which causes an increase of the powers of digestion, the acidity of the saliva will cease.

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The following difference between the action of pepsin and papain is important to note :—With or accompanying the acidity of the saliva, there is an excess of acidity in the stomach. This can be removed by prescribing *Natron bi-carbonicum* (bicarbonate of soda), &c., but as soon as the acid in the stomach is thereby decreased, the effect of pepsin is paralysed, because pepsin only acts when it comes in contact with a free acid. As, however, papain digests either with an acid or alkaline reaction although best in pure water, it is clear that papain will decrease any acidity of the stomach or saliva, and promote a good digestion. This is an important point to bear constantly in mind. "I consider it a most remarkable circumstance that meat soaked in papain and water, or even moistened over with it, will not putrify (rot), but can be kept for days in a room without further care, to keep it from going bad. On the other hand, meat moistened with water, without any admixture of papain, and kept in the same room will rapidly decompose."

We may add to this that we have only the last day or two ourselves seen letters recounting the beneficial effects of 30 gr. doses of papain taken three times a day with meals, in cases of torpid liver and stomach derangement, and also of another very interesting case of a planter who was living at a great distance from medical aid, and suffering terribly from derangement of the digestive organs. He was completely cured from taking, with his food, a tea-spoonful of the fresh juice of the papau.

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According to the *Central Blatt for Textil Industrie*, the industrial energy now being developed in Brazil is accompanied by various projects of interest to China-grass consumers. A concession has been granted to a German resident, by which various rights as to the treatment of the fibre are secured to him for a lengthened period. The researches of various scientific authorities have resulted in the climatic advantages of Brazil being fully established with reference to China-grass cultivation. The hope is expressed that the German mercantile community will unite in this object by forming an association, and thus acquiring a position compensating them for that which North America has gained by the prospective arrangements for growing China grass in the Southern States.

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The interest taken by Australian capitalists in the development of the territory held by the British North Borneo Company is well worth the notice of the public. Several joint stock companies have been floated with great success in the colonies for the purpose, especially in connection with sugar. Mr. de Lisser, an agent of one of them, a short while ago, paid a visit to Melbourne from Sandaka, and on being interviewed on board the steamer at Brisbane by the editor of the *Australian Tropical Planter*, he gave a few facts connected with the capabilities and resources of North Borneo. He says that there can be no doubt that the island is as fertile as New Guinea and as prolific as Ceylon. The soil and climate are highly suitable for cane, labour is more than abundant, everything is done by the contract system. The Government is under Imperial supervision, and, therefore, law and order is perfect. Labour consists of all kinds of Asiatics, and in a short time cheap cane-sugar from Borneo will be seen in Melbourne. Tropical culture of every kind flourishes, and the cane crop averages from 50 to 90 tons of cane per acre. The growth of cane in the nursery is sometimes astonishing in height and weight, and it is thought they should yield over 4½ tons of sugar per acre at the very least. If so, this is up to the Hawaiian production, and to the best Tweed, Johnstone, and Burdekin plantations During M. de Lisser's visit to Melbourne his syndicate arranged to purchase a gigantic mill recently erected in Cochin China, which was found too large to work profitably in that country. It was made by Manlove, Alliott, Fryer & Co., and is said to be the largest sugar mill in the world.

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A new plan of growing wheat has been tried at the Cawnpore Experimental Farm. It consists in dividing the field into strips, alternately raised and depressed. The crop is planted on the raised strip; and the depressed strips, during the growth of the crops, are constantly cultivated. In the following year, of course, the strips change places, and the inventor claims that, by this means, full crops of wheat could be grown year after year on the same field without manure. This view is challenged by English agriculturists, who are of opinion that the soil would become, in time, greatly impoverished, owing to the active nitrification set up by the constant tillage, and the loss again of nitrates so formed, by drainage, not to mention the extra labour of constant ploughing. The experiment at Cawnpore gave but a modified success. The crops sown on the higher ridges were exposed to the wind, and were thrashed out by it just when the grain was ripe. The actual outturn of the area under crop, however, was very high, equal indeed to the highest yield obtained by liberal manuring elsewhere; a result which does not seem necessarily due to the system of cultivation, which, except for the crop being in higher ground, was that usually followed. Moreover, the area left uncultivated—in this case two-thirds—has to be taken into account in estimating the outturn per acre. It is proposed to utilise the intermediate spaces by growing a leguminous crop, which, as is well-known, has a beneficial effect on the soil by its power of concentrating and retaining nitrates in it. Major Pitcher in this connection indulges in a natural regret that such great issues, as are involved in these experiments, should hang on a stray field in Cawnpore; and that there are not in India, as in America, hundreds of farmers ready to test, fully and practically, any such idea that presents any glimmer of progress, accepting cheerfully, as inevitable, the axiom, that in experimental work, there must be as much disappointment as success. We fear the day is yet far distant when this will be the case in India. Even in England, Mr. Mechi was looked upon as a visionary theorist, and for years stood alone as an experimental farmer. Possibly the proposals of the North-West Provinces' Director of Agriculture, Mr. Smeaton, for enlisting the co-operation of zemindars, as Honorary Assistant Directors, may arouse some interest in such matters, even at the cost of a little self-sacrifice.

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*15½ grains to a gramme.

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The report on the prospects of the rice-crop in British Burmah, for the month of January, is as follows:—"All the crops have now been reaped, and a large proportion of them threshed. The result of the enquiries made by the district officers, amongst the cultivators, is that the crop of the present year in most districts has given an average yield; the estimate of a twelve-anna crop over the whole province is, therefore, maintained, and the exportable surplus is estimated at 975,000 tons."

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It is an acknowledged fact that the production of cotton and its consumption go on side by side, and all cotton produced disappears without any great effort to get rid of them. What is more, it is quite apparent that with the increase in the demand (growing up every day, it will, in the next few years, be fifty per cent more than it is now. In connection with this subject, the following statistics prepared by Mr. W. J. Basilié, who has devoted a long series of years to the study of it, will show the colossal magnitude which the trade has assumed from small beginnings. The total production of cotton last year amounted to 9,401,000 bales. The quantity consumed may be thus approximately reckoned—America, 2,238,000 bales; England, 3,666,000 bales; European continent, 3,120,000 bales. The consumption of cotton by Indian spinners may be left out of consideration. All the cotton produced went into consumption with the exception of a trifling balance of about 386,000 bales; and, as the records of previous years show similar results, the first portion of the theory advanced may be assumed to be correct. Now, let the figures be analyzed so that data may be obtained as to the probable future consumption of cotton. The consumption of cotton in England for cotton goods exported is 2,534,760 bales, and the consumption of cotton goods in Great Britain is 1,131,240 bales, the latter quantity being equal to 12 pounds of cotton per annum for each person. The consumption of cotton goods sent from England to the East Indies average annually 1,737,000,000 yards, equal to 1¾lbs. of cotton per head; and to China and Japan 443,000,000 yards, or 4 ounces of cotton per head. The consumption of cotton in Europe for cotton goods imported is 620,000 bales, and the cotton consumed on that continent for cotton goods there manufactured is 2,500,000 bales, equal to 6 pounds of cotton per head. The consumption of cotton in the United States for cotton goods exported is 1,403,000 bales, and the cotton consumed for cotton goods manufactured for home use is 835,000 bales, equal to 6 pounds per head. Taking past experience into consideration in conjunction with last year's consumption, it is under-estimating future consumption to assume that within the next three years, the requirements of the East Indies, China and Japan will rise to 2¼ pounds of cotton per head, which will give an increase of 2,478,200 bales. It has already been said that the consumption of cotton in Great Britain is 12 pounds per head per annum, and on the Continent 6 pounds per head per annum.

Ignore any increase in the consumption of Great Britain, but allow the European consumption to increase from 6 pounds to 8 pounds per head, which is a moderate computation, seeing how the consumption has grown during the last decade, and in two or three years there will be from Europe alone an increased demand for cotton amounting to 1,250,000 bales. Then allow an increase in the American consumption to bring up its total to 2,613,000 bales, and the result is that within a year or two or it may at the outside be three years, there will be required by cloth manufacturers 13,127,200 bales of cotton for the year's work, and it requires no stretch of the imagination to see that in five years' time 15,000,000 bales will be required for manufacturing purposes.

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The Chief Engineer, Government of Madras, in submitting a statement of traffic on the Godaveri and Kistna Delta Canals, and on the Dumagudiem, Buckingham and Kurnool Canals, for the half-year ended on 30th September 1884, remarks that the amount of tolls and license fees collected from boats registered for traffic in the Godaveri Delta canals, was Rs. 42,377 more, while the amounts collected from boats registered for traffic on the Kistna Delta Canals and on the Buckingham Canal were, respectively, Rs. 5,107 and Rs. 7,897 less than those collected during the corresponding period of the previous year, the variations being due to the introduction of the revised rules for navigation, under which a single license, issued for the official instead of for the calendar year, entitles a boat to ply on all the canals. The large increase in the tonnage of boats on the Godaveri Delta Canals seems to be due to the carrying capacity of the boats being, under the revised rules, calculated at 50 instead of at 75 cubic feet a ton. In the Godaveri Western and Kistna Eastern divisions, the last column of the statement for the half-year ending 30th September 1883, has been left blank, as the statistics were not properly registered during that half-year.

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Mr. W. Wilson, Director of Revenue Settlement and Agriculture, Madras, has submitted a statement showing the distribution of 20 maunds of Nankin cotton seed received from the North-Western Provinces in June last year. On the question of the encouragement of the growth of Nankin cotton and of the manufacture in jails for military purposes of cloth woven therefrom, he refers to the letter addressed by Messrs. Binny and Co., to the Government of Madras, on the subject. It is perfectly clear that there is in this presidency private enterprise which is perfectly able and willing to manufacture cloth from Nankin cotton that would be suitable for army purposes, if only the raw material can be procured. Messrs. Binny and Co. whose terms are moderate offer Rs. 15 a candy less than the price guaranteed by the Government of India to producers of cotton grown from seed distributed through Government agency; but now that there *are* buyers in the market, the question comes whether the competing guarantee of the Government of India should not be withdrawn. The guarantee was given in view principally to the encouragement of the growth of this particular variety of cotton, but if there be established a sure and certain demand for it for military or other purposes, no guarantee of price by Government for the raw material will be necessary to ensure the growth of as much as the market may require. From the letter of the Superintendent of Army Clothing, it appears that the quantity of cloth required for a sepoy's uniform suit is about 8¾ yards. At Messrs. Binny and Co's price of As. 4-3 a yard in Madras, which is only 3 pies a yard higher than the price that the Government of India propose to issue, the cloth manufactured at Buxar central jail for a sepoy's suit would cost in material Rs. 2-4⅝, that is, As. 11⅜ less than the Rs. 3 value of the free issue of material, to which under the regulations the sepoy is entitled. The cost of the material for a suit issued by Government from Buxar jail at the cost of the raw material is Rs. 2-2⅜, or 2⅛ annas less per suit than Messrs. Binny and Co's price. The Government of Madras in a recent Resolution says that the question whether the Government of India guarantee of four annas per pound for cleaned Nankin cotton should be withdrawn, need not now be considered ; when the cotton comes into the market, if it is found the guarantee interferes with private enterprise, it will no doubt be then withdrawn.

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A MEETING was recently held of the German coloured paper manufacturers at which Herr Dassauer made a report on unpoisonous colouring matter. The object of the meeting was to aid Government in passing a law which will be acceptable to all. Dr. Prior, of Nuremberg, has made very exhaustive experiments with all the colouring matters used. He believes that the great practical point for the Government to do would be to fix the maximum quantities of poisonous matters used in colouring that are innocuous. He says : " Every chemist knows that it is absolutely impossible in technical business to employ chemically pure raw or half raw materials without enormously increasing the cost of production. Many raw materials contain arsenic, lead, copper, zinc, etc., which, when working them, are incorporated as auxiliary stuffs and half manufactures. It need only be mentioned that English commercial sulphuric acid contains arsenic and lead, and these are at least partially contained in the products made with it. Besides this, every chemist that has an experience with technical chemistry knows how difficult it is to wash out a copious precipitate so as to remove the smallest quantities of the salts that have been dissolved in a liquid. Many precipitates retain a portion so inveterately that it cannot be removed at all. It would be requisite to place certain limits in the matter so as both to give due weight to these technical considerations, and, on the other hand, to protect hygienic interests. The innocuousness of these quantities can be ascertained by reckoning them from one gram of colouring stuff. Then, as under 100 square centimetres of wood can be dyed in water or varnish colours and about 600 square centimetres of paper, one gram of colour therefore, or 100 square centimetres of painted wood, or 600 square centimetres of paper hangings, etc., should contain :

Chloride of barium,	0·0151 gr.	Chloride of zinc,	0·0209 gr.
Carbonate of lead,	0·0025 ,,	Bichromate of potassium,	0·0056 ,,
Sulphate of lead,	0·0029 ,,	Chloride of tin,	0·0160 ,,
Sugar of lead (acetate),	0·0029 ,,	Sulphate of copper,	0·0045 ,,
Sulphate of zinc,	0·0247 ,,	Arsenical acid,	0·0026 ,,

Several manufacturers thought the quantities would in any case greatly vary, according to the use of the papers. Dr. Prior's views were adopted.

SILAGE IN INDIIA.

II.

It was shown by us in our first article on this subject, that a succession of *wet* seasons rendering hay-making almost impossible in some localities in England, had recently forced the system of ensilage upon the attention of English agriculturists. It is not a little curious that the introduction of this system into France was brought about by a diametrically opposite cause. In June 1870, there appeared an article in a French journal, in which M. Vilmorin-Andrieux called the attention of French farmers to the process of ensilage ; but had it not been for the abnormally *dry* season of that year which forced its attention upon them, the attempt would probably have remained barren for years. Once introduced and its value observed, the system grew rapidly in popular favour, and has been generally adopted by French agriculturists.

The scarcity of fodder in India during the hot weather and in the rains, and the chronic starvation of the cattle therefrom, have told heavily upon all native breeds of cattle, as is seen in their degenerating in their capacity of yielding milk, as well as in other respects. One of the most important elements in the food of the Indian people is cow milk, and anything which interferes with milk production, either in quantity or quality, is a matter of the greatest moment. Hence it is that the question of ensilage is so important in Indian agriculture, and it is gratifying to hear of an attempt here and there by conferences and meetings to consider the advisability of this method of ensilage in India. Apart from the consideration of the subject by the Commissariat, if its usefulness can but be brought home to the Indian peasantry who as a rule possess a few heads of cattle each, so as to make, by this shift, themselves independent of the sun and rain, and save their cattle during seasons of drought, the system will soon work its own way. What seems to be wanted is a trial for the system upon a scale and under circumstances which should emphasize the verdict obtained from that trial. We are neither advocates for nor antagonists of the system. A series of careful and adequate experiments in the different provinces and districts is what we look for, and our aim is to lay before our readers what is already known on the subject in England, America, and Europe.

The use of *silos* or pits for the storing, or to preserve uniformity of expression, for the ensilaging of grains, has been successfully practised in India and other Eastern countries for ages, and is still resorted to widely in some form or other. In Europe, the Moors introduced it into Spain, and from the latter country, it found its way into France, where it may even now be seen on a large scale at the stables of the Paris Omnibus Company. The *silos* which have thus such high historical antecedents, do not however appear to have been used in Europe for the preservation of *green fodder* before 1861, Herr Reihlen, of Stuttgart. having first drawn attention to the subject in 1862. " It is well-known that in Germany, most large farmers grow extensive areas of sugar-beet, and that the leaves of the plants are used as green fodder in the autumn. The oxen which are to be fattened on beet root pulp during the winter, are employed in the autumn as draught animals, and then require concentrated and very nourishing food. The beet root leaves must, therefore, be used wastefully in autumn, or altogether wasted, unless they can be *preserved* for mixture with other food in winter. This is the explanation which M. Reihlen gave in 1862 for his first attempt at preserving green food in silos." We have simply quoted what is said by Mr. Jenkins, of the Royal Agricultural Society of London, as to the origin of ensilaging green fodder in Germany. The practice found its way into France in 1870, and since then has been slowly but steadily gaining upon the favour of French agriculturists. The system was brought under the notice of British farmers some years ago, but it is only within the last two or three years that they have attempted to preserve green fodder in silos in England.

We shall now pass on to a study of the subject under the following heads :—

1—Construction of silos.
2—Filling, and covering silos.
3—Opening silos.
4—Utilisation of silage.
5—Chemistry of silage.
6—Crops fit for ensilaging.

We shall take each of these headings in order, in our future issues.

INDIAN WHEAT.

A RECENT official memorandum of the Indian wheat harvest of 1884 tells us that the total area under this cereal in the country is about 26,000,000 acres, and that the total yield in a fairly good year, is about 135,000,000 cwt., or 30½ million quarters. This is an average out-turn of 9½ bushels or 5¼ cwt. per acre. The average yield in England meanwhile is 30 bushels an acre, in strange contrast with the abnormally low production in India. This remarkable difference leads us to institute a comparison between the chief factors of wheat-growing, in the two countries respectively.

As regards soil, it may safely be affirmed, and without fear of contradiction, that India does not suffer by the comparison. It is difficult to realise how an English farmer with a soil sometimes but six inches deep, or hardly that, overlying a hard rocky subsoil, can raise 28 to 30 bushels of wheat an acre. It is evident that the cause of the unusually low average in this country, is not in the character of the soil, but must be sought elsewhere. In the method of cultivation, there seem to be two primary differences between Indian and English agriculture. Although a good deal has been written and said in India on the subject of rotation of crops, the question has never been fully put before the Indian public, in its proper aspect. Reserving a complete consideration of the subject for a future occasion, we may point out that in English agriculture, wheat generally follows clover in rotation, and succeeds best after it. The fact was first ascertained by experience, and has since been scientifically verified, and accounted for. In India no doubt, the ryot practises some sort of rotation for wheat, as it generally follows autumn paddy, locally called *aus*, or jute known in the vernacular as *pat*. But neither *aus* nor *pat* is a crop really suited to prepare the soil for wheat. The valuable property which clover possesses in a high degree, of preparing and enriching the land for the coming wheat crop, has no existence here. The Indian rotation for wheat, so far from benefiting it, not unlikely injures the wheat. For both *aus* and *pat* are exhausting crops, particularly the latter, leaving the soil more *hungry* than before. They would seem to be the very last crops that should be selected to precede wheat in rotation, if it be our aim to benefit the crop by such rotation. Here, then, is an open field for the practical but scientific farmer to try his skill. We want to discover a good rotation for wheat. At present we have none. Where wheat is grown year after year on the same soil as in the Nerbudda Valley, without any rotation at all, the Indian peasant cannot expect to raise crops like those of the English farmer. But in England where this practice of growing wheat year after year upon the land, has had full trial, it has been definitely proved that it *can* be so grown for a long time, without any sensible falling off either in quantity or quality, so long as the land is periodically and liberally dressed with manure. This is valuable experience acquired for the Indian peasant by the perseverance of the British farmer, and the expenditure of capital, and the principle holds good not only with wheat, but is likely to do so with all the cereal crops grown in India, and used as staple food; and the fact has to be brought home to the Indian peasant, who complains that his land will grow no more wheat, or has become wheat sick. Our ryots require to be taught that the land will grow wheat, if properly cared for. Conservative as they are, it is useless to ask them to depart from their routine methods of cultivation, and to use the droppings from cattle as manure, knowing they can ill-afford to spare them for the purpose; but they can be made to understand that Rs. 2 or Rs. 2½ per bigha laid upon the soil as *nitre* will accomplish the purpose. This sum will buy half-a-maund of the manure, which mixed with five or six times its weight of ashes of cow-dung, or other fuel, or indeed any powdery matter available, and spread over the young wheat crop as top-dressing, is sure to increase the yield, in nine cases out of ten, to twice if not three times the normal nine bushels an acre or three bushels bigha. If by an expenditure of Rs. 2½ per bigha, an increased yield of 3 bushels or say two and-a-half maunds may be reaped, it means a clear profit of Rs. 2½ per bigha, the wheat being supposed to sell at Rs. 2 per maund. This almost incredible profit of cent per cent will not surprise the initiated few who take an interest in agricultural questions. The real clue to the marvellous success of English agriculture is mainly, if not wholly, due to the introduction of chemical manures through the admirable and sustained exertions of Sir J. B. Lawes of Rothamsted. The average produce of wheat per acre in England is unparalleled in any other part of the world, and it is chiefly due to the practice of top-dressing with nitrate of soda, or ammonium sulphate—two most useful and valuable manures at the disposal of the British farmers. To come nearer home, the Cawnpore Experimental Farm grew last year 56 bushels of wheat per acre, and the plot which gave the yield was treated almost precisely as we have now suggested. We shall recur to the subject, as it is plainly of the very last importance.

Miscellaneous Items.

A Bombay contemporary hears that the Theatre Royal at Grant-road is to be converted into a flour mill.

In Nebraska, the people are said to be burning corn for fuel, because it is cheaper than coal. The stove is known there as the cornatory.

The Bengal Government estimates the stocks of rice in and around Calcutta for the first week of February at 19,31,974 maunds, of which 8½ lakhs are available for export.

A tidal wave from three to four feet high visited the north coast of Tasmania on the 6th of January, and appears to have done some damage to the shipping in the river Leven, as well as to have washed away a large quantity of timber that was piled on the banks of that river, and of the Emu and Forth rivers, ready for shipment.

France stands in the sixth place for the production of malt liquors, there being in the country 3,000 breweries, which produce 157,000,000 gallons. England heads the list with 27,000 breweries and 990,000,000 gallons. Then come Germany, the United States, Austria, and Belgium. Below France the order is Holland, Denmark, Sweden, Switzerland, Russia, and Italy.

A carefully prepared table of the Australian wheat crop of this season shows that the average yield for the colony of Victoria will be about 9¼ bushels per acre, and as the total area cultivated is 179,000 acres, this will give a total of 11,441,000 bushels of wheat. After allowing for home consumption and for seed, it is expected that there will be 4,581,000 bushels available for exportation.

The Government of Madras have authorised the Collectors of the different districts which suffered from the cyclone in December last, to use their discretion in granting remissions of assessment. This will, of course, be a great help to the cultivators, but in addition to this, the Government of India has made a special grant of Rs. 3,75,00 for repairs to minor irrigation works, many of which are also damaged by the floods caused by the storms.

The latest reports of the condition of the crops throughout the Bombay presidency state that they have been slightly injured by mildew in parts of Nasik, and by frost and blight in parts of Poona. The cotton and tobacco in some parts of Hyderabad in Sind have suffered from frost, and the same crop has been blighted in a few parts of Dharwar and Belgaum. A scarcity of fodder and drinking water still continues in parts of the Southern Mahratta districts.

With the failure of the coffee plantations, the Ceylon planters turned their attention, and with much success, to tea, cinchona, and cocoa; and now we see that another product, cardamoms, is proving very remunerative. On one estate of only 50 acres, 12,000 lbs. have already been picked, and it is estimated that before the end of the season the crop will reach 20,000 lbs., in which case, at the present price of cardamoms, the returns would be equal to about £40 an acre.

A contemporary hears by wire that at a large and influential meeting held at Bellary lately, it was unanimously resolved to memorialise the Government of Madras, bringing to its notice the present state of distress of the people of the district, who are already emigrating in large numbers in consequence of the failure of the monsoons, and praying that immediate steps be taken to commence the Soongabhadra canal project as the best means of meeting the present and guarding against future distress from famine, which is of periodical recurrence in this district.

That harmless, and, as some will say, necessary drug, tobacco, is becoming one of the most valuable friends of the Chancellor of the Exchequer. The "Statistical Abstract" shows that in the year 1881, the latest to which the return relates, the duty on tobacco brought in a revenue of no less than £8,658,947. The sum is nearly one-half of the total yield of the customs duties of the year which brought in altogether £19,210,460. Tobacco has quite superseded wines and spirits in their ancient prerogative as the chief supporters of the national purse. Wines and spirit together brought in during the above year £5,819,826.

Irrigation progresses slowly and satisfactorily, if not to any large extent, in the Bombay presidency. The irrigation works are few and far between, except in Sind. Last year the area irrigated was increased by about 4,000 acres, and this is all the more satisfactory as the rainfall of the season was above the average, which shows that even in a good rainy season the ryots are able to appreciate the benefit of permanent irrigation works. Another fact which may have led to the increased demand for water is, that the rate charged has been reduced to four annas an acre, which appears to be so small a rate that Colonel Le Mesurier, the Chief Engineer of the Irrigation Department, says that most of the cultivators could not believe or understand so large a reduction.

The French steamer *Ville de St. Nazaire*, 1074 tons, Captain G. Benoit, arrived in the Pondicherry Roads a few days ago from Cayenne, Guadeloupe, and Martinique, having on board 244 time-expired and other emigrants. 40 deaths from dysentery occurred during the voyage which took 40 days from Martinique: many of the coolies are of the better class who have served several contracts;

having been employed as maistries and in other superior positions; most of these brought considerable sums of money with them, mostly in gold coins and bills, but a good many others were very poor. Wages for all kinds of Indian labour are still high throughout the French Colonies, especially at Cayenne, where first class estate maistries earn from Rs. 50 to Rs. 60 per mensem; ordinary coolies get from Rs. 16 to 26 per month. There were a good many sick among the coolies landed, who were immediately conveyed to a camp which had been formed for their reception outside the boulevards on the south beach, and placed under medical care.

Selections.

THE AGRICULTURAL RESOURCES OF INDIA.

A PAPER on the above subject was read on January 23rd, before the Society of Arts, London, by Mr. E. C. Buck who is now returning to this country. After alluding to the absence of agricultural statistics concerning India, which would not be remedied until 1886, when the report recommended to be compiled by the Famine Commissioners will be published, Mr. Buck paid a well-earned compliment to Sir John Strachey, for having been first to recognise and insist upon the necessity of such a report. He referred to the substitution of permanent agricultural departments instead of periodical establishments to assess rents only once in twenty or thirty years, as "one of the chief reforms" of Lord Ripon, and exhibited to his audience the first volume of the series comprising the reports which will be published in 1886 as the result of that reform. He then endeavoured, for the better understanding of the subject, to give his audience some ready method of realising the actual extent of India:—

Taking Egypt as the unit, the North-West Provinces, exclusive of Oudh, is for administrative purposes marked off into five large and two small so-called divisions. Now, assuming the population of Egypt to be 5,500,000, and its cultivated area to be 5,500,000 of acres, we find that in cultivated area four out of the five large divisions of the North-West Provinces are each of them equivalent to about four-fifths of the Egypt unit, while the fifth division is an Egypt and a quarter. The statistics of population bring out similar results. Altogether, in cultivated area and population, the North-West Provinces are equivalent to about five Egypts. The little province of Oudh, which is held like a ball in a cup by the North-West Provinces, is as large as an Egypt-and-a-half. Bengal would absorb no less than ten Egypts; and the Punjab three-and-a-half more; Bombay, with Sind about the same; Madras, about eight Egypts. The Central Provinces in population less than two, but in cultivated area more than four, with a possible, if not probable, extension to eight Egypts. British Burmah gives one Egypt, with a possible extension to several more. Assam, of which an Egypt-and-a-half is cultivated now, can be, it is believed, expanded into at least four. Berar, less than an Egypt in population, exceeds it in cultivated area. So far the British provinces. I will not venture into the native States.

Passing next to the climate of India the lecturer asked, "Why should that triangular spit of land which we call India possess such infinitely greater value than the immeasurably more extensive trans-Himalayan regions?" The answer we gave as the one word "Rain." But, he explained:—

Although the monsoons of India confer upon it its agricultural rank amongst other countries, yet, within India itself, they vary immensely, and create enormous varieties of climate in combination with two other varying factors; (1) the temperature due to latitude, and (2) dryness due to distance from the seaboard, or to the scantiness of underlying water; the consequence is, that there is no crop in the world which India cannot produce. This is a great advantage.

Dividing the year into four quarters, the south-west monoon, the monsoon *par excellence*, occurs, he explained, in the third quarter, the south-east monsoon in the fourth, and the north-west in the first. He continued:—

Now it is the combined force of these three monsoons, mechanically assisted by the mountain ranges, that provide the agricultural resources of India, and raise it to an importance which the barren wastes of the huge continent to which it hangs cannot reach. But it is not only in pouring showers and moisture on the crops of each year that the monsoons create the agricultural resources of India; they also wash down, and have for ages washed down, in rivers and floods, the fertile soil on which their crops are grown. They also fill vast underground reservoirs with perpetual seas of fresh water lying dormant, too, in the annually renewed reservoirs of mountain-stored water, is an enormously powerful mechanical force, which will some day, be enslaved and controlled by the patient perseverance of our engineers, and will do much to make up for the absence of coal in the northern continent. I now wish to lay very great stress indeed upon one point. Although the monsoons confer all this agricultural wealth, the uncertain character of the rain, in the greater part of India, is so excessive, that the agricultural outturn, so far as it depends on the rainfall *of the year*, oscillates violently. How to overcome this oscillation, or to mitigate its effects, is the great problem which has to be solved, and it is, I am glad to say, being vigorously attacked, and to some extent solved in India.

Unfortunately it is in the areas of uncertain rainfall, which are the battlefields where a continual fight between death-dealing desiccation and life-bestowing moisture is carried on, that the largest populations are often found, and it is only by bringing to their aid every means of assistance (not irrigation alone) to enable them to overcome or mitigate the effects of desiccation, that the agricultural outturn of the Empire can be most materially increased. Before indicating these means, I will try to give some little idea of the area of uncertain rainfall.

Eastern Bengal, Assam, Burmah, the Central Provinces, and a strip of Madras, Mr. Buck then enumerated as the districts which have enough rain to produce crops sufficient for the maintenance of the cultivator and the payment of his rent. The part of India on the other hand where the monsoon is often insufficient—denominated by Mr. Buck the "shrinkage area"—he described as a vast belt "which stretches like a sash from the Punjab through the North-West Provinces and Rajputana, and then tying itself in a knot on the south-west edge of the Central Provinces, drops in a wide and ragged band through the Deccan, Mysore, and Western Madras." The "sash" part being the area not reached by a weak monsoon, and the hanging band, the "rain shadow" of the Western Ghats which intercepted the rain-clouds. He then continued:—

Owing partly to historical cause, and partly to the fearful struggle that has to be carried on with nature in many parts of India, the Indian cultivators have, as a rule, developed into the most patient, hard-working, and, in many cases, skilful agriculturists that can be found on the face of the earth. Inured to privation, accustomed to maintaining life on short meals, and with scanty clothing they give their labour for the smallest return it is possible to conceive. The consequence is that, broadly speaking, the agriculture of the country is carried on by a vast human machine, a machine of flesh and blood which is cheaper in its working than it is possible for any machine of steam and iron to be. I have just met a Public Works official who went from India to America to look at the agricultural machines in that country. Nothing, he said, struck him more than the way in which machines diminished in size and frequency as he passed from a region of high wages to a region of low wages. In India we come down to a region where the wage-level is so low that the multiplied power of human muscles, or the multiplied power of very weak cattle, supersedes all but machinery of the very lowest order. Wages are rising, and will continue, with civilising influences, to rise still more; but until they do, the question of increasing the products of the country by the application of machinery must be considered a secondary one. The first and primary question is, how far it may be possible for the Government to increase the effective working power of the two flesh-and-blood machines, the men and their cattle—and thus fulfil a duty which a feeling of humanity as well as a desire to develop agricultural wealth, imposes upon it. The system of agriculture is, as you know, eminently one of *petite culture*. I shall be exaggerating very little if I say that the country is split up into so many millions of five-acre farms. The holders of these farms are small tenants, paying rent over a large port of India direct to the State, and over a still larger part to a landlord, or a landlord intermediate between them and the State. As a rule the cultivator will do anything that is necessary within the boundaries of his own five acres; it is a delicate matter to meddle with him there.

But outside his five acres he can do nothing; and as (with due regard to certain bright exceptions) the intermediate proprietor avoids doing anything, it devolves upon the Government to take whatever measures may be possible and expedient, (1) to prevent the deterioration of the working power of the agricultural machine, and (2) to improve its working power. Five years ago, England sent a message to India that the people must not be allowed to die of starvation. But Sir James Caird and General Strachey, who bore that message, found that much more was necessary than to provide the starving people with food when famine was on them. It was necessary, they found, to secure to them a normal condition of strength and health; and the consequence was that the exhaustive report, written when the labours of the Famine Commissioners were concluded, by their able secretary (Mr. C. A. Elliott), suggested administrative reforms of all kinds, which, at first sight, had little to do with the question of famine, but which, on examination, were found to have very much to do with it indeed. For the whole country being built up as it were of those five-acre bricks, it is found that all administrative problems, however intricate, can be resolved into factors in which the five-acre unit and the prosperity of the five-acre holder is the most important one of all. The net result of the Famine Commissioners' mission was a further message to India from her Majesty's Secretary of State, inviting closer inquiry into vital and economic facts, and the adoption of measures tending to increase the produce of the country as well as to cope with famine.

After quoting the words in which Lord Ripon gave this message to the country, Mr. Buck proceeded:—

I will indicate briefly the directions in which the State, *or landlord-in-chief*, is taking measures *for* the *maintenance of the full* working power, as well as for the increased efficiency of the great muscular machine. They are these:—The promotion of railways; of canal irrigation, and of well irrigation; the improvement of the revenue and rent systems; the reclamation of waste lands, with the establishment of fuel and fodder reserves; the introduction of agricultural improvements; and finally, emigration. Railways, with few exceptions, tend to ameliorate the condition of the cultivator mainly in two ways. Firstly, they ensure him a better average price for his produce when he has a surplus for export; secondly, they bring him food at a cheaper price when he has insufficient for subsistence. On the one hand, his average receipts are greater, and on the other, his average cost of living less. But there are two questions which have, within the last year or two, cropped up in connexion with the effect of railways on food, with respect to which I should like to say a word or two. One is the position of a remote tract, in which corn is said to be raised at a very small cost, and which is assumed to be worth tapping because the price is low. But is it not the case that the price is simply low because the corn cannot get away to a market, and that the cost of it is small because the wages are calculated in terms of the corn which, as matters stand, has little or no value? But bring a railway to a tract like that, and the price of the exportable surplus will at once rise to the market value, and with it the price of labour by the conversion of the wages into cash at the new money rate. Is not then the real benefit of the new railways to give to the cultivator of that tract a more substantial return for his surplus, and supply that surplus at a cheaper rate than it would otherwise be carried to a distant point on the railway where there is no surplus, or to a port? The other question is this: A fear has been expressed—I am not sure that an assertion has not been made—that railways, by facilitating the export of wheat, injure the country, because they deprive it of a part of its food supply, and that the population of India being already under-fed, should not be allowed to lose a single pound of food. What it would appear right to do is to analyse the wheat exporting tracts, one by one, and ascertain whether the wheat has deprived the agricultural population of any one tract of any portion of its food supply. Such an analysis is being made, and so far as it goes, it shows that the export wheat has not deprived the agricultural population of the exporting province of a single pound of food, but has, on the other hand, enriched them by an increase of about 50 per cent in the value of the produce exported. On the whole, the expenditure of capital on railways, does, by providing the cultivators of precarious tracts with cheaper food when their harvests are insufficient, afford a quicker benefit to a greater number than irrigation or any other measure Government can undertake, and rightly heads the list The next means of aiding the cultivator in his fight against the desiccation caused by the caprices of the monsoon of the year, is irrigation by canals and wells, *i.e.*, by the utilisation of water stored up by monsoons *of previous seasons* in the mountain ranges, and in underground seas. A very great deal has yet to be done to make these stores further available notwithstanding the magnificent labours of our engineers. When the Famine Report was written out of about 200,000,000 acres of cultivated land in British India, only 8,000,000 acres were watered by irrigation works, and 12,000,000 acres by wells. All I can say is that every nerve is being strained by our Public Works Department to develop canal irrigation; and next year we shall be able to show you maps of what has been done, and can still be done. Many people have an idea that canal irrigation injures land. The idea is a dangerous one, because it contains half the truth. Water freely applied stimulates production so enormously that the soil becomes temporarily exhausted, and the produce is sometimes for a series of years less than it was before in an average year. But the certainty of a harvest gradually attracts a population. The manure supply and cattle increase, and the ultimate produce becomes much greater than at first. I believe the best safeguard against the intermediate exhaustion of which I have spoken, is to charge a full price for canal water, and thus prevent its wasteful use. Be this as it may, it is impossible to over-estimate the utility of canals in securing certainty of production in every tract in Northern India where the underground freshwater sea is too far from the surface to be cheaply tapped. The present policy is to confine, as far as possible, the expenditure of capital to such tracts. For where the water is near enough to the surface, say on the right side of 50 feet, the agriculturists can build themselves wells, and, as a rule, they build them more cheaply than Government, and only want advances and freedom from excessive taxation of the water as an encouragement to construct them. This encouragement is now being given; and after a long series of experiments, conducted by the officer of the Public Works Department, before mentioned, and whom I now see here to-night (Mr. Wilson), it seems proved that the best direction in which Government can offer positive aid is in employing boring tools to ascertain, by a cheap trial, the character of soils and water in doubtful tracts, *i.e.*, in tracts (very extensive and numerous) in which the cultivator is afraid to undergo the costly experiment of sinking a well through unknown strata, without being sure of results. On the whole, I believe that the irrigation of India may be increased ten-fold over the area of uncertain rainfall, and that the produce may be doubled on the irrigated area.

Mr. Buck then proceeded to advocate the growth of fodder trees and bushes, and the conversion of wastes, *i.e.*, culturable land as yet uncultivated, into pastures to improve the half-starved weak breeds of Indian cattle which he compared very unfavourably with those of Egypt. Goats which are more than anything else to blame for the absence of pasture in India, must be kept strictly off such land He next referred to the experiment being made by Mr. Wilson among others, for the reclamation of the alkali-wastes into good pasturage lands, for "when once the alkali is *mastered it becomes a useful manure instead of a hurtful* poison." Wisely refraining from more than a mere glance at the "improvement of the rent system," the lecturer then turned to a subject which he said had never received sufficient attention, the emigration of coolie-labour to the "equatorial sea-girt lands" of Borneo, Java, North Australia, parts of Africa, &c. The encouragement of coolies to emigrate, Mr. Buck strongly recommended for three reasons. In the first place the wages thus earned enabled the coolie on his return to his own five-acre farm, to farm it properly; secondly, young men were only thus enabled to amass capital sufficient to purchase farms, and, thirdly, if India neglects at once to occupy these splendid markets for her labour they will be filled by China. With respect to the introduction of agricultural machinery to supersede manual labour, Mr. Buck did not anticipate that much could be done quickly. He said:—

> The only machine which has met with unqualified success in superseding a machine of the country, is a small portable sugar-[illegible] with iron rollers, that can be carried by two men, and [illegible]ed by one weak bullock, which is replacing the wood or stone pestle and mortar, in which natives have hitherto pounded their canes. It is now sold by thousands. But the machine was not brought to its present state of perfection without years of patient trial and experiment, although its inventors, Messrs. Mylne and Thompson, planters of Bengal, were thoroughly conversant with the local agriculture. This fact indicates, firstly, that the improvement of native machinery can only be worked out by experts on the spot; secondly, that the natives will not, when they are convinced that a machine is profitable, refuse to take it. These conclusions justify the continuance of steady perseverance in experiments by local experts, but does not encourage the transmission from Europe and America to India of expensive machines, which have not been modified by competent experts, so as to suit the conditions of the country.

In conclusion, the lecturer once more reminded his hearers that—

> The best, if not the only way of keeping the cultivators out of the capitalists' hands, and of giving an industrious farmer the chance of being his own banker, is to eliminate, as far as possible, the uncertainty which now attends his harvests. The efforts of Government in this direction received an important and effectual impetus from the mission sent out by the people of England, of which Sir James Caird and General Strachey were the leaders. Much, very much, remains yet to be done. But though the work of protection is far from being accomplished, rest assured of this, that whatever pictures may be drawn of local distress in some parts of India, in the greater part of the Empire the condition of the cultivators is materially better than it was fifty years ago.—*Pioneer*.

FIFE FARMERS' CLUB ON THE COMPARATIVE VALUE OF MANURES.

At the fourth quarterly meeting of this club, held in the Royal Hotel, Cupar—Mr. Watt, Kilmany, in the chair—Mr. Mitchell, Fliskmilu, read a lengthy and interesting paper regarding the experiments made at several stations with artificial manures. At the outset he dwelt on facts and figures, chiefly gathered from the reports of the Aberdeen Agricultural Association, under whose auspices a large number of experiments were conducted by Mr. Jamieson, with the view of testing the value of various chemical manures. In summarising, Mr. Mitchell stated that 1,644 experiments had been made with different chemical manures in Scotland, principally in Aberdeenshire, and 128 in England. The experiments in England did not afford the same proof of the efficacy of phosphates by themselves, as was the case in Scotland; but when nitrogen was applied along with the phosphates, rapid growth and a heavy crop was the result. Mr. Jamieson says, these experiments have demonstrated (1) that the turnip plant can no more grow without phosphorus than without water or air; and (2) that it must have the phosphor given to it in an unhurtful form (that is to say, it must be neutralised by oxygen and lime, or a substance similar to lime; this triple compound is termed a phoshpate; (3) a full crop of turnips (say 30 tons—equal to 67,200 lbs.) contains only about 30 lbs. of phosphorus; (4) bone is an effective manure, mainly on account of the phosphorus that it contains; (5) the more thorough the pulverisation by grinding (or "finer the division") of bone, the earlier the action on the plant; (6) undissolved phosphate, in finely ground coprolite, acts almost identically with phosphate in crushed bone, that is to say, the action is slow, but lasting, and the crop is healthy; (7) dissolved phosphate acts more quickly than undissolved phosphate, and gives usually a rather heavier crop, but a less healthy one; (8) too quick action, resulting in rapid early growth, tends to produce ultimate disease in the plant; (9) steamed bone flour possesses nearly the same rapid action as the dissolved manures, combined with the healthy and lasting action of the undissolved manures, and produced heavier crops than either, allowing for its nitrogen; each pound of phosphorus in steamed bone flour can be got for about *6d*. Mr. Mitchell then proceeded to consider the question whether dissolved bones induced 'finger-and-toe,' and after reading from Mr Jamieson's report, he said it will be seen that in every comparison the evidence against dissolved manures becomes stronger. In 1881, where the manures were all vitriolated, the diseased turnips amounted in one group to 1,566, and they ranged from that number to 1,129. Where the manures were of a varied sort the numbers ranged from 575 to 925. Where there was no vitriolising they ranged from 78 to 383. It was some years since a shrewd observant neighbour remarked to him that he was sure superphosphate and dissolved bones produced 'finger-and-toe;' and Mr. Jamieson, by these experiments, had proved that idea to be thoroughly correct so that in any soil likely to produce diseased turnips, or where the disease has formerly appeared, it would not be prudent to use a vitriolated manure. In regard to the solid nourishing matter in turnips, Mr. Jamieson's report stated that we were accustomed to attach not a little importance to the fact of a manure increasing a crop of turnips by a few tons per acre; but it was necessary to reflect that in 100 parts of turnip 90 parts were water, and that the proportion of water ran up and down from 88 to 93 parts, and that a crop of 20 tons, containing 93 per cent of water, was only equal to one of 11 tons 13 cwt. as compared with one of 88. In 1876 it was found that nitrogen-manured turnips contained more water, and hence a smaller proportion of solids, than turnips grown without nitrogen. In 1877 this was confirmed, but not uniformly. In 1878 it could not be said that nitrogen had increased the proportion of water. In regard to the effect of soluble phosphates, he found:—In 1876 crop, soluble gave more solids than insoluble. In 1877 the result was in the opposite direction—a bad season, however. In 1878, soluble gave more solids than insoluble. The final average of 200 experiments showed that there were 997 per cent solids after soluble phosphates, and 972 after insoluble—a difference of 0.25 per cent, or equal to ½ ton of turnips on a 20-ton crop. Nitrogen, on the other hand, appears, except in a backward season, to reduce the solids by about 0.87, which would be equal to 2 tons less on a 20-ton crop. Mr. Mitchell then quoted the results of experiments as to the effect of nitrogen, slightly differing from some of Mr. Jamieson's remarks. He (Mr. M.) had, in some seasons when it was cold in June, seen several fields manured without sufficient stimulus, and had to be sown and resown, and the braird did not come away, or did not thrive, till the middle of July. He found that they got a great increase by the application of nitrogen, and the increase was not all water. He came therefore to the conclusion that if they wished to grow a full crop, nitrogen in some proportion must form one of the ingredients of the manure. The speaker next took up the subject of the best manures for cereals, as illustrated by Mr. Jamieson's experiments. The general results were—(1) Phosphate of alumina has exerted little or no influence on crops; (2) phosphates of lime alone have increased the crop from 13 to 28 per cent; (3) phosphates of lime and nitrogen have increased the crop from 38 to 73 per cent. As to the different forms of phosphate of lime, it was found that between the mineral and animal forms there is no material difference; between the insoluble and soluble forms there is a difference in favour of soluble—10 to 15 per cent; nitrogen, alone with different forms of phosphates, nitrogen, and insoluble phosphates, increased the crop 47 per cent, or 32 per cent extra by nitrogen; nitrogen and soluble phosphate increased the crop 66 per cent, or 38 per cent extra by nitrogen. As to the different forms of nitrogen, it was found that nitrate of soda, sulphate of ammonia, guano, and bones have given nearly equal results, except that with insoluble phosphates, guano is rather highest, containing as it does some soluble phosphates, and that with insoluble phosphates, nitrate of soda is lowest. This peculiar result, which has been found in turnips yearly, is now distinctly confirmed by a more nitrogenous plant, *viz.*, that nitrate of soda does not act well with insoluble phosphate. It seems probable that in the case of soluble phosphate, its sulphate acid liberates nitric acid, which probably forms nitrate of lime. In the case of the insoluble phosphate no decomposing or vivifying influence is exerted by the nitrate of soda. As to the influence of various manures on the weight per bushel, the increase in this respect seems to go along with the application of phosphates, and especially finely divided and soluble phosphate, but not always uniformly, and the differences are slight. The same results were shown at Pumpherston and Harelaw. Dr. Aitken states in his report that it is evident from the crops obtained on these plots, that to use potash salts alone, or phosphates alone on Pumpherston, is to bury money, much of which may never be found again. Even when we apply the two together, as shown on plot 17, the crop is a failure. He says how different is the result obtained by the application of nitrogen. Lastly, when all these are combined, and a manure containing nitrogen, potash, and phosphate is applied, the best results are obtained, both in the quantity of grain and straw. The same results have followed the application of nitrogen in the growth of barley. The application of nitrogen and phosphates has held good in the continuous growth of wheat on the same land at Rothamstead. Mr. Mitchell concluded by reading an extract from an essay by Dr. A. P. Aitken, chemist to the Highland Society, confirming the views he had expounded.

The Chairman, having complimented Mr. Mitchell on his able and exhaustive paper, invited discussion.

Mr. Russell, Luthrie, said he used to employ dissolved bones on his light chirly land. He had a very nice braird of turnip, and got them well singled, but they all went with disease. He was now in the practice of using drill bone or bone-meal, and semi-dissolving it with liquid manure, and he found he had now cured the disease—(hear, hear).

Mr. Ballingall, Dunbog, said he had listened to Mr. Mitchell's paper with great pleasure; and was gratified to find that the results which had been obtained by competent chemical authorities, such as Dr. Aitken and Mr. Jamieson, corresponded so closely to those at which he had himself arrived. They all knew that they could not grow turnips well where the land was not well manured with phosphates, or ammonia, or nitrogen. Some years ago, when bone flour and phosphates where as cheap as they are now, he was in the habit of using them, along with Peruvian guano (which has since become old-fashioned and gone out of the market) as the principal part of his application, and he was glad to find that practice had been so remarkably confirmed by the results of frequent experiments. As to the grain crops, he believed they all agreed that a large part of the manures applied should be ammonical. He thought, however, that the best way was to apply these manures well to the turnip crop, and let the grain crop in a great measure take its own chance. If that were done he did not think the cereal crops would require much assistance from artificial manures—(hear, hear). In listening to Mr. Mitchell's conclusion, the first thing that occurred to him was that it would be a very fitting outcome of the paper if it resulted in the formation of some kind of association by which young men—enthusiastic young men—would be induced to devote a portion of their time to the experiments suggested. Were the association conducted on proper principles, they might secure the personal assistance of some such competent chemist as Dr. Aitken, who was so much engaged in these researches; and they might be enabled to make experiments for themselves, which need not be on either an extensive or an expensive scale. By giving a little special attention to these experiments, and comparing notes from year to year, they might arrive at results which would be of great benefit to them all—(applause).

Mr. Carswell, Rathillet, quite agreed with Mr. Ballingall as to the benefits which might be derived from the experiments he had suggested. In carrying out these experiments, he was sure all the members of the Farmers' Club would be glad to lend their assistance. As each district had its own peculiarities, they might find the results brought out very different from those arrived at by Mr. Jamieson, for it was not at all improbable that what might be advantageous in some districts might be the reverse in others. There was one manure which he thought should receive more attention, *viz.*, potash or sulphate of potash. That was a manure that was of great service in all crops, especially in the case of light land. He thought that an unammoniacal manure was also of service in bringing away turnips rapidly, and carrying them safely through that dangerous time when they were so liable to the attacks of flies. Looking to the different conditions in which phosphates were used, he thought that soluble phosphates should be used in strong clay soil, and that on lighter soils bone-meal or coprolite might have a very good effect.

Mr. Dingwall, Romornie, concurred in Mr. Ballingall and Mr. Carswell's remarks as to doing what they could in the way of experiments. Instead, however, of having any association specially formed for the purpose, he thought the experiments should be carried out directly in connection with the club—(hear, hear). It would be an excellent stimulus for the club to have work of that kind to carry on, and the experience acquired might lead to very important results. A good many years ago he was in the habit of making some of these experiments himself, and there was one point he would like to see more earnestly enforced—and that was the most suitable time for using ammoniacal or phosphatic manures for turnips. His experience was that ammonical manures should be used for early turnips, and phosphatic for the later ones. The year in which he made his experiments there was a very bad braird, and the results—if he had attempted to follow them—would have been very misleading. There was one point, however, which he could not help remarking, and that was that where ammonical manures were used, a very large proportion of the turnips dropped off before the end of the year. They simply rotted and were unfit for use. He therefore thought that their experiments, to be of any use, should extend over a good number of years.

Mr. Mitchell, in replying, suggested that some of the young men connected with the club should go up to Rothamstead and examine the experiments there.

Mr. Thom, Leden Urquhart, moved that in order to give practical shape to the suggestions thrown out by Mr. Ballingall, Mr. Dingwall, and Mr. Carswell, the committee of the club be instructed to consider what steps should be taken with the view of establishing an experimental station—(hear, hear).

This was agreed to.

Mr. Dun thought, however, it would be as well to get the experimental station taken up by some landlords, for he believed few of the farmers would hold out long enough to gain more than one year's experience—(great laughter).

Mr. Storrar, Rossie, did not think that Fife, as a whole, had ever been in the habit of going in largely for expensive manures; but he thought that many of them might still with advantage curtail their manure bill. There was nothing more important than to get a good crop of turnips; but seeing they all depended so much on the climate, it were better to save their money than to lavish it on expensive manures. Considering the low prices at present got for grain, it would be a mistake to use much of light manure. So far as that crop was concerned, their best plan was just to take what Providence sent them—(laughter). He scarcely agreed with trying experiments of their own, and would prefer to get more information from those experiments that were being already conducted.

Mr. Ballingall said it was all very well to get all the information they could, and no doubt the experiments suggested would put them to a little inconvenience and a little cost, but would anything convince them more readily or open their eyes more thoroughly and make them better acquainted with their business than putting their own hands to the matter, and conducting these experiments themselves?—(hear, hear). He by no means thought of having an experimental farm, but they might work in combination on a general principle, and under the advice of some of their members who had some experience in making similar trials. The knowledge thus gained might be of great value to the district—(applause).

Mr. Mitchell said he had overlooked Mr. Carswell's remarks about potash. Magnesia and soda, he should have said, were always necessary. Dr. Aitken had made experiments with these chemicals, and found that a great improvement resulted from the addition of potash.

This concluded the discussion, and the Chairman intimated that in the event of Mr. Tod, Gospetry, not being able to read his paper at next meeting, it would be desirable that some volunteer should be ready to take his place, and should, if possible, give intimation to that effect to the secretary within eight days.—*North British Agriculturist.*

CHEESE AND BUTTER FACTORIES.

[*By Professor Sheldon.*]

A recent announcement has been made to the effect that the farmers in the neighbourhood of Rocester have decided to establish a cheese factory, and that, at the meeting held on the 16th instant, when the matter opened and settled, the milk of no fewer than 400 to 500 cows was promised in the room. Rocester is an interesting little market town, pleasantly situated in the beautiful valley of the Dove, a river which for a considerable distance, and until it falls into the Trent, forms the boundary line between Derbyshire and Staffordshire. The town is on rising land, just within the borders of the latter country, and is surrounded by one of the finest dairying districts in the Midlands—perhaps one of the finest in the British Isles. Dove Valley cheese, indeed, was famous in the early part of the current century, the days when local reputation was of more account than it is just now, and when men and their fancies were less cosmopolitan in character than they are to-day: when each dairy of cheese of any consequence went year after year to the same consumers—to consumers who inquired for it at the shops, and when dairymaids were seldom unsuccessful in different years and on different farms. Those were the days when farms were self-supporting, when commercial fertilisers and feeding-stuffs were unknown, and when the herbage on the pastures was in a normal and natural condition. Then, as I have been told by old men who are dead, it was an easy matter to make good cheese almost anywhere, though the yield of it was small.

With the spread of modern farming, the yield of cheese became larger, and the difficulty of making good cheese was correspondingly increased. Yet farmers prospered, and as the years rolled on, farmers' wives were seldomer the dairymaids, and hired dairymaids became scarcer in proportion. The difficulty of finding good dairymaids seemed to culminate some fifteen or twenty years ago in the Midland counties, and men who were anxious for the welfare of dairy farming in those counties were casting about for some way or other out of the difficulty. It was admitted that cheese-making was heavy and untidy work, unfit for farmers' wives, as a rule, who had the care of house-keeping and of a family of children on their hands. It was even said, so warm were people in favour of a change, that it was not women's work at all, but should be performed chiefly by the aid of machinery, and on a scale commensurate with the use of modern appliances. At this stage of reasoning, the transition from farm-house to factory cheese-making was easy and simple enough; but though factories were desired in many places, it was found an easier thing to talk about them than to set them going. True, they were as yet untried in England, and no one could foretell with certainty how they would fall in with the special requirements of English dairying; but they had been long in use in America, and were rapidly increasing in number in that country, while the quality of American and Canadian cheese was just as rapidly improving. These were the reasonings which led to the establishment of two factories in Derbyshire, in the spring of 1871, one in the town of Derby, and the other on the estate of the Hon. E. K. W. Coke, at Longford. During the next three or four years, some twelve or fifteen other cheese factories were started in various counties, and then the increase ceased entirely, seeming to prove, in some measure, that the factory system of cheese-making did not supply an adequate solution of the difficult problem which, in modern days, had become developed in British dairying, and which, as I may say, is still in process of solution.

There were, of course, many opponents of the factory system, and its advocates had anything but plain sailing all the time. Others there were who were lukewarm on the subject, on both sides of it: and yet others who, being favourably disposed towards it, preferred to wait the verdict of time and experience. The chief reason, however, why no more than about twenty of these institutions were established is found in the rapid development of the milk trade some half-score years ago—a development, by the way, which, in an intermittent and irregular manner, has been in progress ever since. This new departure in country dairying, providing as it did a fresh outlet for surplus milk, was owing in a great measure to the Food Adulteration Act, and to the stricter regulation of urban and suburban dairies, which led to the disestablishment of a good many of them. As a result of the operation of the said Act, the public had better milk supplied to them, and this promoted a great increase in the consumption of that beneficent fluid. In this way an enormous demand for country milk arose, and the disestablishment of urban dairies had the direct effect of increasing the volume of that demand. The railway companies, too, afforded facilities for the transit to town of country milk, and in this way the lacteal fluid of scores of rural districts was tapped at its source.

In the *Journal* of the Royal Agricultural Society of England for 1875, Mr. J. C. Morton, one of the ablest of living agricultural writers, contributed an interesting and valuable report 'On Cheese-making in Home Dairies and in Factories,' in which the *pros* and *cons* of the subject are set forth with admirable lucidity. The conclusion arrived at was, on the whole, in favour of factories, though the spirit of the inquiry was perfectly impartial from beginning to end. An interesting footnote to that report runs as follows:—'I understand that on Lord Vernon's Derbyshire estate, although the advantage of the cheese-factory system has been frequently urged upon the tenantry, no application has yet been made to the landlord for the erection of a factory. The fact is that in remodelling the farm building on this estate, the dairy arrangements have been made as perfect as the tenantry can wish.' The inference from this footnote is that the farmers, with facilities improved, preferred to make their cheese at home. But this inference is wide of the actual facts of the case, for many of the farmers in that locality—Sudbury, a few miles south of Rocester—instead of making their cheese at home, began to devote, in fact had already begun to devote, their energies to the expanding milk trade.

This they continued to do for some years, until at length, the milk trade being overdone, more or less demoralised by irregularities that had crept into it, they began to cast their eyes in another direction. The milk trade, in fact, was no longer, taken all the year round, a tempting or profitable occupation for the rank and file of the Dove Valley farmers, and the increased scarcity of good dairymaids more than counter-balanced the advantage of perfect dairy arrangements. The difficulty of recommencing cheese-making at home, after an interval devoted to the milk trade, is best understood by those who have tried it. The upshot of all this on Lord Vernon's estate was the erection by the late Lord Vernon, than whom never lived a warmer friend to British agriculture, of a butter factory, to which the surrounding farmers could send their milk. This factory has been in operation a few years doing very well as things go nowadays, and proving a boon to the milk suppliers. The present Lord Vernon takes a warm interest in the improvement of dairy farming, and is ably supplemented by his agent, Mr. Algernon Fawkes. The factory, as I have stated in a previous article, now is lending itself to the tuition of dairymaids, every facility for this object being afforded by Lord Vernon and by those in his employment.

And now, a few miles from Sudbury, and in the same Dove Valley, it has been decided to establish a cheese factory. One was also opened in the spring of the present year at Gratton, in the Bakewell district, in the county of Derby; this, too, for the convenience of farmers who had grown tired of the milk trade, so that the era of cheese factories appears to be entering on a new stage of development, and the milk trade on one of modification. These two industries, identical in their preliminaries, and well designed to supplement and relieve each other, will find a tolerable balance in time, though, as we must admit, cheese-making does not promise to be a very remunerative business for some time to come. There seems to be for the present a better prospect for butter-making in factories, wherever the business is well managed, and the skim-milk can be favourably disposed of. Stock raising, butter factories, cheese factories, and the milk trade there are as bells, so to speak, on which may be rung the changes that give variety and afford profit to the dairy farming of Britain, which, all things considered, is the most attractive of the different branches into which an agricultural industry may be divided.

It is abundantly clear that the old slip-shod practices followed so long in dairy farming, and still so very prevalent throughout the land, will not answer our purpose in the future, even as well as they have done in the past, which is not very much after all. The yield of dairy produce on almost any given farms, even on those that have been well managed, has been much smaller on the average during the past seven years than it was in any other seven, I may say, in the last thirty years; this is owing to the wet and almost sunless seasons we have had, and to the reduced fertility of the land. The volume of foreign competition has more than made up the difference, or prices would have been so much higher than they are, as to make amends to some extent for the reduced yields of beef, of milk, of cheese, and of butter. It is to be hoped, indeed, that our yield will improve with better seasons; but there is no prospect of a falling-off in foreign competition. Prices, therefore, are not like to increase very much, and the only way to increase them a little, and even to maintain them where they are, is to produce a better article; and in order to do this, a comprehensive system of dairy education, encouraged by landlords, land agents, and everybody interested in the welfare of our insular agriculture, must spread itself over the face of the country. It will afford me pleasure and satisfaction to contribute my mite, be it never so small, to the improvement which is so greatly to be desired.—*North British Agriculturist.*

MR. JOHN WILSON ON LAYING DOWN LAND TO GRASS.

We are indebted to Mr. John Wilson, formerly of Edington Mains, now of Wellnage, Duns (whose familiar pen, our readers will be glad to see, is as fluent as ever), for the following:—

Permit me to make a contribution to the discussion now in progress in your columns on the best methods of laying down land to grass, by a narrative of my personal experience in conducting that process. About thirty-five years ago, I resolved to lay down to grass about 11 acres of land at Edington Hill, as an adjunct to a lambing shed. It is very light, weak soil, with no natural fitness for yielding a good sward of old grass; but was selected for its convenience of situation, for being dry, fairly well sheltered, and having a constant supply of water. It had just then carried a good crop of turnips, which were eaten on by sheep, and was thus clean and in good condition. Being anxious to do things well, I went to considerable expense in providing a mixture of seeds of natural grasses, along with the clovers in ordinary use, and sowed these, about the end of April, without a corn crop. It happened that the weather was dry for several weeks after sowing, so that at first the braird was very partial; but at last rain fell, when the seeds brairded well, and with them an excessive growth of annual weeds, which by and by got so luxuriant that I feared my attempt was to end in failure. At last I set a squad of mowers to work, who cut quite a heavy swathe of this rubbish. I was soon gratified by finding that I had interposed in time to save the seeds from being smothered; for in a short time they came away thick and vigorous, and prospered ever after. When the seeds were sufficiently established to stand it, large quantities of turnips, with cake and corn, were consumed by sheep on this field every spring. Stimulated by this annual manuring, it continued to yield quite a remarkable quantity of good grass down to the end of my tenancy in May 1877.

A few years subsequent to this experiment in sowing grass-seed without a corn crop, I discovered, by what I may call a happy accident, that a valuable forage crop could be taken, not only without harm, but with positive benefit to the seeds. A severe and prolonged snowstorm had rendered it necessary to feed the sheep on the farm of Rawburn in Lammermuir, then occupied by me, so long that by the end of it the store of hay was quite exhausted, and had to be replenished, if possible, before another winter. As it would have caused serious inconvenience to reserve for mowing as much of the grazing land as would have sufficed for this purpose, I resolved to sow tares, to be made into hay, on a 26-acre field, then due in the ordinary rotation to have carried a crop of oats, after turnip, and sown up with small seeds. I used for this purpose the small Kœnigsberg tares, as being less liable than the large Scotch tare to lodge and smother the small seeds. The tares produced a heavy crop, which I had no difficulty in making into hay of excellent quality When in due time it came to be served out to the hill sheep, they decidedly preferred it to meadow hay, and throve better on it. I had purposed to mow this tare crop when in full bloom, but a heavy fall of rain so lodged it that I had, for the safety of the seeds, to cut it before it had quite reached this stage. As it was, the seeds were unharmed, and I never had a more successful take of young grass than on that occasion. This first trial having been so successful, I continued to resort to the same expedient, both at Edington and Rawburn, as often as need required, and with unfailing success. The only change I made was that, always after this first instance, I used a mixture of oats and tares—2 bushels of each per acre—both because this produces a heavier forage crop, and one less liable to smother than grass seeds. I never had any difficulty in cutting down such crops with the ordinary reaping machines; and my rule was to cut as soon as the oats were fully shot. This was usually about the end of July, so that the seeds had a long time to get established before winter. My unvarying experience has been that by the following spring the seeds thus treated proved to be the earliest and best young grass that I had. Hay made from this mixture of oats and tares cut green is much relished by all kinds of stock, which thrive upon it. Let me say that if showery weather occurs when the hay-making is in hand, great care must be taken not to allow the cocks to stand long on the same site, else the seeds will be damaged; and, also, that when carried the stacks should be thatched as fast as they are built, as this kind of stuff is very liable to damage from rain. Let me add another caution—pigeons, both wild and tame, are so fond of tares that unless they are vigilantly herded early and late, from the moment of brairding until the second leaf is out, the crop will inevitably be ruined by these vermin. I claim, then, for this plan of sowing small seeds along with a forage crop of mixed oats and tares (1), that it entirely avoids the risk from annual weeds which is incurred when seeds are sown without any protecting crop; (2) it gives a valuable green crop to be converted into hay (or silage, if preferred), which, being mown before its seeds have even begun to form, has no appreciable effect in lowering the fertility of the soil; (3) it affords beneficial shelter to the young grasses and clovers at the stage of growth when they specially need it; and (4) from being relieved from this crop at the very beginning of autumn, the seeds have ample time to get well rooted and established before winter. Indeed, they will usually make such rapid and luxuriant growth at this stage, and present so tempting a pasture for lambs, that unless the owner exercises a strong control, both over himself and his shepherd, there is the utmost risk of irremediable damage being done by over-grazing at the very outset. The plan now described is no mere theory, but is the record of long-continued practice on a large scale, and under great diversity of soils and climate. I can recommend it to others with thorough confidence.

CLOTHING WALLS WITH IVY.

It is a common error that ivy is objectionable and even destructive to walls as a covering, fostering as it is said decay, and harbouring damp. Those who urge these objections must either have had few opportunities for observing its effects when well kept and properly managed, or they have observed very superficially indeed. It is no doubt true that if ivy is allowed to run wild and become a tangled mass of confusion, or if it is allowed to penetrate into cracks in the wall, or under eaves, or into the material of a roof, it will quickly work havoc; but that is no fault of the ivy, but of those whose duty it is to develop its usefulness and restrain its destructive tendency. Ivy properly kept may be made the very best protection for faulty walls against damp and the general effects of the weather. The point is easily demonstrated. Ivy that is properly trimmed and kept presents an equal and close mass of foliage to the weather, at such an angle as will prevent rain and snow from penetrating to the wall as effectively as if it were covered with slates for the purpose. If there is a flaw in a wall, such as a crack or bad brick or stone, in which any limb of the ivy may find room for development unobserved, then there is danger that it will work as the wedge when the thin edge is inserted; every course of the sap of the plant will be like the driving home of the wedge—slower, perhaps, but not less sure, certainly none the less effective because unobserved,—till the increased bulk of the limb disturbs the fabric and brings it to the ground. We have seen a case in which the roof of an ivy-clad turret was lifted visibly off the plumb by the increasing growth of the plant, which had been allowed to increase unnoticed, year after year, by those whose duty it was to keep it in proper order. But cases such as these only prove that it is a dangerous or destructive covering to a wall if it is neglected. It must be regularly trimmed, at least once a year, and no wall should be planted with ivy without first being put in a good state of repair. The best time for trimming ivy is March, before growth commences, and it should then be gone over with the hedge shears and clipped close. The eaves of the walls should be carefully examined at the time of trimming, and every particle of growth removed from the wall from four to five inches under these. The whole surface of wall and ivy stems should be brushed over afterwards with a hard broom, to dislodge dust and small vermin. For a hardy plant of comparatively free growth, ivy is by no means so easy to establish on walls as might be expected. It should be established in pots before being planted, in order to make the most successful start with it. It is a mistake also to suppose that it does not care for good soil. It is as fond of a bit of good rich soil as any plant, provided always it is well drained; good drainage it must have, but it derives no nutriment from the wall that supports it. Those seeming rootlets, they fulfil no function of the roots, but merely serve to support the plant in its position, and enable it to extend the area of its foliage. If in pots, the plants may be transplanted at any time or any season of the year. They are usually planted and the shoots nailed up to the wall at the same time. This, though the common plan, is not by any means the best. It is long before the plants take to the wall with their aerial roots and fix themselves, and the older parts never do actually fix themselves, because the aerial roots are only emitted from the young shoots in the course of their growth. The best way to establish ivy is to lay the stems along the base of the wall after planting, and fix them close to it with pegs; then when growth commences the young shoots will take at once to the cool, moist bottom of the wall, and never look behind it afterwards. The practice of planting ivy as an undergrowth beneath trees, while very desirable for the purpose of clothing ground where little else would grow with verdure, involves some some risk to the trees. If the ivy is allowed to climb on the trees it will certainly injure, and sooner or later kill them, if unchecked. It should therefore be prevented from attaching itself to the stems of the trees by careful annual attention. Nothing in the way of ornamental verdure will succeed better under the shade and drip of trees, but it must be watched, and kept thoroughly in check.—*North British Agriculturist.*

THE SUGAR QUESTION.

By the West Indian Mail just to hand, we have received copy of a paper on the above subject read before the Trinidad Agricultural Society by Mr. H. A. Fitt, and we subjoin the more important portions of it, though we must not be understood as thereby endorsing his views except as regards improved machinery and more economical management. We are persuaded that it is quite hopeless to look to the Home Government for help in the shape of countervailing duties on Bounty fed sugar, or for its sanction to the raising of a colonial loan, to pay off estate mortgages. Here, however, is the principal portion of Mr. Fitt's paper:—

"To meet the difficulties and dangers of our position many expedients have been suggested. Among them are the means of getting rid of the Foreign Bounty, the attempt to get extended to the colonies by the Government of the United States the most favored nation clause, and a reciprocity treaty as regards the West Indies with the United States Government. By means of a conference it was thought the bounties might be rescinded, but that course has been negatived, and the evil is allowed to remain in the futile hope that it will eventually cure itself. It behoves us to persevere in pressing the British Government to impose a countervailing duty, as the only ready and effective means of placing our sugar on a footing of equality with the foreign article. It is not thought by the United States Government that the most favored nation clause extends to the colonies; a different opinion appears to be held by Lord Derby, yet his Lordship has desisted from arguing on his own view of the case, and the matter has been dropped. May not this Association urge on Lord Derby to resume the discussion with the United States Government on the basis of that which he holds is contained in the treaty? The third proposition is yet in abeyance, and will remain so till we know what are the reciprocal advantages the States propose to give and receive.

"Whatever advantage may result to us from any of these propositions ought not to cause us to defer the attempt to reduce to the lowest point the cost of producing sugar. This may be effected partly by increased production from the same area of cultivation, by improved crushing power, and the many small economies it would be tedious to enumerate. Immigration which, by the number of coolies now in the island is through their consumption of excise and dutiable goods rendered self-supporting, requires in respect to the distribution of its cost to be by the Local Government reconsidered; a petition should be presented to the Legislature to that effect, and until that is considered, immigration should be suspended.

"By its suspension the heavy export duty of six shillings per hogshead on sugar will be saved, and that much will at once be removed from the cost of production.

"Another and very important matter remains to be advanced, and for which I would bespeak an attentive consideration.

"Many sugar proprietors are paying a very high rate of interest on mortgages; great would be the relief if this rate of interest could be reduced, but this can only be effected by payment of the mortgage debt, the assistance to accomplish which may be afforded without risk or inconvenience by the Local Government. The proposition is not novel. Instances will be adduced to show that the Imperial Government, to relieve a suffering population, has advanced money at a rate of interest almost nominal, and the Local Government also on similar grounds has made considerable advances. About the year 1860 advances were made by the Local Government for the construction of tramways in the Naparimas and Chaguanas, purely to assist the planters of those districts to get their produce to market, although at that time the Government was infinitely less rich in resources than it is now. These advances by a rent charge were repayable in twenty-four years, and were punctually defrayed. Another instance may be cited of equally statesmanlike views held more recently by the Government in respect to the construction of railways.

"Here then are two instances when the public purse has been readily opened; on the first occasion it may be said for individual benefit, on the second occasion to promote a great public object.

"A third demand now presents itself, when under the guarantee of the Government, the sugar planter, on the verge of ruin and more precariously situated than was the Naparima planter in 1860, may be enabled to effect a reduction of interest on his liabilities, and with other economic savings so far reduce the cost of his commodity as to meet and contend successfully with the unfair competition with beet sugar to which he is hopelessly exposed in the British market.

"An application to the Government of the nature shadowed forth, finds in full accord a precedent of British Legislation in 1880, under 'The Relief of Distress Ireland Act.' That Act provides for the issue of £750,000 at one per cent interest commencing in two years after the loan, and payable by thirty half-yearly instalments, solely for the relief of Irish distress.

"That which I am emboldened, under the precedents quoted, to suggest is a loan at four per cent interest and two per cent sinking fund, repayable by a rent charge to cover interest and sinking fund, at six per cent per annum, in twenty-seven years. The repayment would defray twenty per cent of the loan in nine years, forty per cent in fifteen years, sixty per cent in twenty years, and the whole in twenty-seven years. The money so advanced would be applied to the payment of mortgage debts, and the Government would thus acquire the first lien on the property. At the end of twenty-seven years the estate will have liquidated all of its mortgage liabilities, and that at no greater outlay than payment of the annual rent charge or six per cent—two per cent less than is now paid for interest alone.

"It is difficult to conjecture what would be the liability thus required of the Government, but it is not likely to be great, as large European houses possess the means and opportunity of borrowing to supply their wants as regards interest at the rate mentioned—it would only therefore be the less affluent of our planters that would be applicants for such relief, whose united claims may amount to £100 000. Should this scheme, simple in itself, presenting no difficult complications, and offering undoubted security, commend itself to this association, its adoption will at once render stable many tottering proprietors, prove to be a great lever in restoring value to property, and be the partial means of retaining in cultivation many sugar plantations that will be soon falling into decay, and which otherwise may eventually be abandoned.—*Planters' Gazette*, English paper.

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

The disease commences with a slight derangement of the stomach, but, if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions he will be able to determine whether he himself is one of the afflicted:—Have I distress, pain, or difficulty in breathing after eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does a thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste? Is the tongue coated? Are there pains in the sides and back? Is there a fullness about the right side as if the liver were enlarging? Is there costiveness? Is there vertigo or dizziness when rising suddenly from a horizontal position? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach? Is there frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one of long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantity of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market-Place, Pocklington, York, Oct. 2, 1882.

Sir,—Being a sufferer for years with dyspepsia in all its worst forms, and after spending pounds in medicines, I was at last persuaded to try Mother Seigel's Curative Syrup, and am thankful to say have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same complaint to give it a trial: the results they would soon find out for themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. Turner.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

St. Mary-street, Peterborough, Nov. 29, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,

Mr. A. J. White. William Brent.

"Hensingham, Whitehaven, Oct. 16, 1882.

"Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) John H. Lightfoot.

August 15th, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.—Yours truly,

(Signed) N. Webb,
Mr. White. Chemist, Calne.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer describes it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Signed) Vincent A. Wills,
Chemist-Dentist,
To Mr. A. J. White. Merthyr Tydvil.

Preston, Sept. 21st, 1883.

My Dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully; in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great—I am, dear Sir, yours faithfully,

(Signed) W. Bowker.

To A. J. White, Esq. (A)

THE

INDIAN STATESMAN,

In which the FRIEND OF INDIA is incorporated,

A WEEKLY JOURNAL

OF

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EDITED BY

ROBERT KNIGHT.

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THE

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A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, FEBRUARY 28, 1885. [No. 9.

Crop and Weather Report.

[FOR THE WEEK ENDING THE 18TH FEBRUARY, 1885.]

General Remarks.—Rain has fallen in several districts in Bengal and in the Central Provinces, in two or three places in the Punjab, at Gowhati and Dibrugurh in Assam, and Ganjam in the Madras Presidency. The fall has been of benefit to the crops in Bengal, but in some places in the Central Provinces it has caused slight damage.

In Madras and Mysore prospects remain unchanged. In Coorg threshing of rice is almost complete. The *rabi* harvest continues in places in Bombay and prospects are good. In Hyderabad, Central India, and Rajpootana, agricultural prospects continue satisfactory. The prospects of the *rabi* are excellent in the Punjab. In the North-Western Provinces and Oudh prospects are still favourable, though in some districts the crops have suffered from blight and insects. In Pertabgurh the opium crop has been considerably damaged by hail. Cloudy weather prevails in the Central Provinces, and is not favourable to the crops. In the southern districts, wheat is fast ripening, and linseed harvesting is in progress.

In Bengal the *rabi* harvest continues, and lands are being prepared for the coming crops. In the Gya District 637 persons are employed on road works and there are 38 persons on the relief register. In Assam standing crops are doing well; mustard and sugarcane are being cut, and ploughing for the ensuing crop has commenced. In British Burmah the rice harvest is over, and crops are being housed.

Cholera is increasing in Travancore, but abating in Coimbatore and Tanjore. Smallpox exists in several provinces, otherwise the public health is generally good; prices are generally stationary.

Madras.—General prospects fair except in parts of Bellary and Anantapore.

Bombay.—*Rabi* harvest continues in parts of five districts; standing crops slightly injured in a few places, but generally in good condition; gram, wheat and cotton withered in parts of Kaladgi; scarcity of fodder and drinking water continues in several talukas of Dharwar and Belgaum and of fodder in parts of Kaladgi; cholera and cattle disease in parts of six districts; smallpox in parts of ten, and fever in parts of fifteen districts.

Bengal.—There has again been some rain in a considerable number of districts throughout the province; it has benefitted the standing crops generally; harvesting of *rabi* crops is going on, and sowing operations of *boro* paddy are nearly completed in Dacca; lands are being prepared for the ensuing crops; prices of food-grains almost stationary; cholera and smallpox prevail in many districts.

N.-W. Provinces and Oudh.—Weather cold; some crops have suffered in places from blight and insects, and opium in Pertabgurh from hail; general prospects are however still favourable; prices continue steady, and the general health is good.

Punjab.—Slight rain in Rawalpindi and Shahpore districts; some cases of mouth-and-foot disease among cattle in Khusat tahsil, Shahpore district; health and prospects in rest of provinces good; prices slightly rising in Lahore and falling in Rawalpindi districts; stationary in other districts.

Central Provinces.—The late rain has caused slight damage in places; but as it fell after flowering had been completed and seed had set, the injury which has resulted is inconsiderable; fungoid disease has appeared in the northern district, but not, it is believed, to any great extent; in the southern districts the wheat is fast ripening and linseed harvesting is in progress.

British Burmah.—Cholera prevalent in one township of Akyab district, in towns of Prome and Shwedoung, and Henzada and Thongwa districts; slight in Rangoon town, parts of Tharrawaddy and Amherst districts; smallpox prevalent in Henzada, otherwise public health good; slight cattle-disease in Bassein and Thongwa Districts; crops being housed.

Assam.—Weather seasonable; mornings and nights cool; land being ploughed for *aus*, but rain wanted to facilitate ploughing operations; sugarcane being cut; prospect good; public health fair.

Mysore and Coorg.—In Kola and Tumkur crops suffering from want of rain; water and fodder becoming scarce; general health good; prices rising.

Berar & Hyderabad.—Weather clear; cotton-picking nearly completed; *rabi* crops flourishing; wheat 22 and *jowari* 26 seers per rupee. *Rabi* crops in ear and thriving; prospects good. Standing crops prospering; *rabi* sowings in progress; general health good; prices stationary.

Central India States.—Weather changeable but sky clear; health good, prices falling.

Rajpootana.—Harvest prospects good; some fever reported in Todgurh and in Ajmere city, but health of district is generally good.

Letters to the Editor.

THE AGRICULTURAL RESOURCES OF INDIA.

TO THE EDITOR OF THE TIMES.

SIR,—In the *Times* of last Saturday you publish a report of Mr. Buck's paper on "The Agricultural Resources of India." It is disappointing to find that in the paper in question the situation and difficulties of the Indian peasant have not even been touched upon, and that where the need for irrigation has been alluded to, no mention has been made of the advisability of holding out inducements to the people to embark their labour and capital in such work as is within their capabilities. With your permission, I propose to offer a few remarks upon both of these points.

The principal point in the agricultural situation of India may be briefly described by saying that, with the exception of land fertilized by rich river water, and of certain very limited tracts where the population is thin, and the feed for cattle ample, the people are living not on the interest, but on the capital of the soil. Nor does it need many words to explain this. Examine the scanty manure heaps, and you will find that they consist almost entirely of the dung of lean cattle, and of its ashes. The value of this manure may be estimated by stating that the dung of grass-fed cattle in England contains little more than 1 per cent of manurial matter. Whence, then, are to be supplied the phosphoric acid, lime, potash, and nitrogenous matters which are consumed and exported, and whence that vegetable matter which is now entirely consumed by cattle, but which is so necessary for the maintenance of the physical condition of the soil? It is evident that, under existing circumstances, but a very infinitesimal quantity of these manurial agents can be supplied to the soil.

Speaking generally, then, it is certain that, with trifling exceptions, the soils of India must not only be extremely exhausted, but also in the worst physical condition, and therein lies the grand evil and difficulty of the agricultural situation. That having been clearly grasped, the duty of the Government is plain. It must endeavour to provide the people with the means of economizing to the utmost the existing manurial resources, and, secondly, search for fresh manurial agents and show how they can be utilised. As the first point, it is absolutely necessary to provide timber reserves *on the lands of every village, where space can be found for the* purpose, and these would supply wood for fuel and leaves for litter, for the want of which the urine of the cattle—the most valuable portion of the excreta—is now entirely lost. As to the second point, the Government must search for potash, salts, and mineral phosphates, and having found them, explain their use to the people. It may be thought that whatever exists in India as regards such resources is already known. There is reason to doubt this. I have been repeatedly assured by Government authorities that there was no hope of finding the mineral phosphate of lime in Mysore, and yet last winter I found that a railway engineer had recently discovered large deposits of coprolites—a discovery of the greatest value to the planters in the province, and which will, of course, be equally so to the native farmers when they are taught to appreciate the value of mineral phosphates. Much, then, may be done by the State to aid the farmers in contending with their greatest difficulties—difficulties which, as yet, the Government has never recognized.

Your space is so valuable that, as regards the second point of importance in the agricultural situation—the holding out of adequate inducements to the Indians to invest labour and capital in petty irrigation works—I cannot in this letter venture to offer any remarks.

I remain, obediently yours,
ROBERT H. ELLIOT.

Clifton-park, Kelso, N. B., Jan. 26.

Editorial Notes.

THE report on the prospects of the wheat crop in the Punjab, for the month of January, is as follows :—"Wheat prospects same as before reported on 15th January. Season most favourable."

⁂

FRANCE appears to be no better off than her English neighbours in the matter of trade and manufacturing vitality. A summary return of imports and exports for the past year, as compared with that of 1883, shows a very large falling-off in three of the four general descriptions of national products, and establishes the universality of the industrial depression of 1884. The reduction on the imported articles was general. Under imports the abatement is striking, amounting to no less than 281,000,000*f.* A large part of this diminution, however, is due to the reduced requirements of foreign food products, which are not necessarily connected with trade depression. But the imports, both of raw materials and of manufactures, have also largely fallen off, the latter by 60,700,000*f.*, and this diminution (observes the Paris correspondent of the *Times*), and the considerable reduction in the demand for raw materials, are decidedly signs of importance. As regards the falling-off in the demand for raw materials, the same correspondent says, it marks a state of trade which must cause really patriotic French statesmen serious alarm. Under exports, the chief source of diminution is the item, manufactures. The French exported during the past year 91,400,000*f.* less manufactures than in 1883. The difference, as between 1884 and 1882, was 43,000,000*f.*, so that the depression in this respect has more than doubled.

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MESSRS. JAMES AND HENRY THOMSON, in their fortnightly circular, say :—"Since the 15th instant 12,000 packages have been catalogued for sale, including 1,940 from Ceylon and 700 of reprinted and second hand Tea. With a more general feeling of confidence the market has experienced a sensible improvement, the dealers being encouraged by a better demand from the country and by the improved character of the Teas now coming forward. Competition has been exceptionally brisk for fine qualities, and many sales have been made of Pekoe and Broken Pekoe between 1*s.* 6*d*, and 2*s* 6*d*, showing decidedly higher prices than have been obtainable for some time past, notwithstanding the augmented supply of good Tea resulting from improvement in the later manufacture from Assam and Darjeeling. and the arrival of some superior "autumn flavoured" teas from Dooars and elsewhere. There is also a movement in the value of good liquoring teas of all makes between 1*s.* and 1*s.* 6*d.*, especially Pekoes, but inferior qualities remain at former prices. In teas under 1*s.* there is not any quotable change beyond a hardening tendency for the best Brokens and Souchongs, coarse and dull liquoring kinds of both leaf and broken remaining neglected at previous rates. The more varied selection of quality now offering as compared with the supply at the end of last year, is undoubtedly an attraction to the buyer, and should facilitate the sale of the balance of the crop, making the result of the year's working more satisfactory to producers and shippers than at one time seemed probable. About 41 million lbs. have now been sold, leaving 24 millions to be disposed of—assuming that the receipts from all ports reach our estimate of 65 million lbs. Last year between 23 and 24 million lbs. were sold between 1st February and 30th June.

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THE third report on the prospects of the cotton crop in the Bombay Presidency, for the month of January, is as follows :—"Sind, in Kurrachee, excessive rain worked harm, elsewhere crops are good, no figures. Guzerat, area about average, but condition below. Sown late in Broach, better in Kathiawar, especially in two divisions ; for the rest the crops are fair. No report from Baroda. Deccan figures incomplete. In Khandesh the season late, and though harm caused by a break, followed by excessive rain and cloudy weather, the crop promises to to be fair, elsewhere the area very much less than usual, in fact, it is quite insignificant ; causes, total failure of early rain and anticipated repetition of damage by late heavy [illegible] as which in fact did again work much loss. In Sholapore, crop almost a complete failure ; scarcely better in Nagar and Poona, slightly better in Nasik and Satara. Southern Mahratta country, condition very variable, average area and crop in three talukas of Dharwar, and fair crop elsewhere, but complete failure almost throughout Kaladgi, and in parts of Kolhapore ; area lessened by absence of rain in black soil district. Belgaum, two talukas estimate two or three annas, elsewhere six to eight annas. Kolhapore, except in one taluka, may show a six-anna yield. Shedding, during cloudy weather, has been prevalent in the best crops."

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AN exhibition of ploughs and ploughing was held at Kethi, in the Nilgiris Division, Madras on the 2nd instant, at which a large number of Badagas, from Merkunad, Paranginad, and Todanad, were present to witness the working of the several ploughs exhibited. The first trial was made on gently undulating ground, which had been for many years brought under the plough, but for the last two had been fallow. The soil was a very light loam, very easy to plough, and was in good condition for ploughing. The top layer of about 2½ inches (the depth usually reached by the ordinary Badaga plough) was apparently much easier to stir than the soil lower down, which was much harder in consequence of not having been moved by former ploughings. Each plough was put on a separate plot of 1,200 square yards. The bullocks were the ordinary ploughing bullocks of the district, with Badaga drivers and ploughmen. The conditions were thus as nearly as possible equal for each plough. In judging the results, the following points were taken into consideration : (1) quality of the work—(*a*) depth of furrow, (*b*) turn-over, (*c*) general appearance ; (2) quantity, *i.e.*, the number of square yards ploughed in the given time, an hour-and-a half. According to the method of marking adopted by the judges, the work done by the respective ploughs was valued as follows :—

Full Marks—165.

1.	Massey's Indian ryot plough	92
2.	Sandeport Ransome and Sim's wheel plough	63
3.	Massey's C. P. plough	61½
4.	Badaga plough	50
5.	Avery's "Hindostan" plough .. .	45
6.	Avery's "American" plough	36
7.	Oakes and Co's small Swedish plough	30

In the second trial four selected ploughs were put on separate plots of 600 square yards, on a steepish hill side ; soil much the same as in the first trial ; Badagas' bullocks and ploughmen, assisted by the ploughmen sent from Madras.

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As regards the quality of the work done in this trial, the judges considered that Massey's C. P. plough, Massey's Indian ryot's plough, and Avery's American plough were equal to one another, and decidedly superior to the Badaga plough in the two important points of turn-over and depth of furrow, whilst in the matter of quantity, *i.e.*, the number of square yards ploughed in the given time, one hour, the following are the results :—

	Sq. Yds.
Massey's C. P. plough	500
Do. Indian ryot plough	450
Avery's American plough	340
Badaga plough	270

The general opinion of those who witnessed the ploughing seemed to be that Massey's C. P. plough was the best implement for this district, although the result obtained in the first trial placed it in the third place, and far below the other plough [illegible] Massey and Co's. It was, however, evident that owing to the unsteadiness of the cattle and the want of skill in the ploughmen, the respective merits of the several implements could not be said to have been fairly ascertained. Avery's ploughs and the small Swedish plough exhibited by Messrs. Oakes and Co. are excellent ploughs, and their failure was principally due to want of proper skill in handling, and to the use of untrained cattle. After the ploughing was over, a Badaga purchased the

C. P. plough and took it away with him. Considering all the real merits that the Badaga plough possesses—its simplicity, its portability, and its cheapness—it is suggested that good may be effected by stimulating the Badagas to improve it, and, with this view, to offer prizes to native manufacturers for improved ploughs. And looking at the Badaga cattle, whose chief defect is not so much want of strength as want of training, it might be well to endeavour to effect a remedy by offering rewards for steady and well-trained animals. Had such animals been available for these trials, the superiority of the European and American ploughs would have been much more clearly demonstrated. Other ploughs were sent, such as the large Swedish ploughs, &c., but as these ploughs require a class of cattle not produced on these hills, they are not mentioned in this report. It was remarked that the wheel plough, by Ransome and Sim, appeared to do its work very easily, although drawn by perhaps the worst pair of bullocks in the show. It is a well-made implement, and probably the best of those exhibited, but it is too expensive for the Badagas, who pull a long face even at the prices put on Avery's and Massey's ploughs.

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FROM a correspondence which has just been published, under the authority of the Government of Madras in the Revenue Department, it appears that, with the exception of that Presidency, no duty is levied on poppy heads in any other part of India, and that no passports or permits are issued by the Indore Agency, authorizing exports from Malwa. It is a fact that poppy heads are exclusively used for medicinal purposes, and the trade in them is very small. Consequently great hardship is suffered by medical men and their patients from the difficulty and, at times, the impossibility of procuring this article of medicine, owing to its being taxed and brought under the opium rules. Under these circumstances, the Deputy Collector, under the Collector of Madras, suggested that poppy heads be excluded from the articles subject to the opium rules of 1880. The Collector of Madras did not, however, think, that in the face of the opinion expressed by the Chemical Examiner, that poppy-heads contain narcotic properties, the Board would alter their view previously expressed in their proceedings, and would probably hold that the simple license fee of Rs. 3 will not preclude the public from obtaining them readily. But his view was that they should be exempted from the opium rules. The matter was subsequently referred to the Board of Revenue, who held that the poppy heads cannot be excluded from the operation of the Opium Act, as sec. 3 defines opium so as to include poppy heads. But taking into consideration the fact that they are exclusively used for medicinal purposes, and the trade in them is very small, the Board recommended to Government that the fee of Rs. 3 levied on licences to sell poppy-heads be reduced to 8 annas. The Government of Madras has approved of the recommendation.

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THE report on the prospects of the wheat crop in the Bombay Presidency for the month of January is as follows:—"Sind, figures not yet available. Crop progressing well, and, in places, show promise of a good season. Guzerat, increase in area 45 per cent over last year, due to replacement of damaged cotton by wheat; benefit to wheat from rain-fall in December; generally crop excellent. No information from Baroda and Kathiawar. Reports from Palanpur and Cutch coincide with those from Regulation Districts *Deccan*, Khandesh figures now received, 255,849 acres, or a decrease of 126,619, compared with last year, when, however, the area was abnormally large. In the Deccan, the average is up to average, and everywhere the crop was benefited by the December rain, but latest reports show a general prevalence of rust, except in Khandesh, where it is trifling, the crop will be considerably below the average. Southern Mahratta country, increase in area considerable but really a nominal one; wheat was put down because it was the only crop in season at the time of the rain; where increase greatest, promise of crop is poorest, for the wheat was sown too late and in uncongenial soil. Dew almost quite absent, due perhaps both to high range of temperature and dryness of atmosphere. In Kaladgi crop is nearly everywhere a total failure."

WITH the sanction of the Governor-General in Council, the Chief Commissioner of the Central Provinces has issued the following Rules under Section 4 of the Agriculturists' Loans Act (XII. of 1884):—

Budget allotment, to which loans made to agriculturists may be debited, will be made to each division for each financial year. Commissioners will distribute this allotment at their discretion among the districts of their division, and will have the power of transferring the amounts so distributed from one district to another. But expenditure in each division must be kept within the amounted allotted to that division. If an additional allotment is required, application may be made to the Chief Commissioner—by telegram if necessary. The maximum amount which a Deputy Commissioner may advance in respect of a single tenure or holding, on his own responsibility, shall be Rs. 300. For loans exceeding *this sum he shall obtain the sanc*tion of the Commissioner. The Commissioner may sanction a loan up to any amount, provided that the allotment for his division be not exceeded. Loans may be made to—

(*a*) owners or occupiers of arable land having a transferable interest in the same, or able to furnish one or more sureties having a transferable interest in land;
(*b*) occupiers of arable land not having, and not being able to furnish in security, a transferable interest in land.

"Without the special sanction of the Commissioner no loan made under Rule III (*a*) shall exceed—

( ) if the security be the tenure of a *malguzar* or plot-holder, eight times the annual revenue assessed or assessable on it;
(2) if the security be the holding of an absolute occupancy tenant, five times the annual rental.

"Without the special sanction of the Commissioner, *no* loan made under rule III (*b*) shall exceed—

( ) in the case of an occupancy tenant, three times the annual rental of the holding;
(2) in the case of an ordinary tenant, twice the annual rental.

"Provided that, if the loan be made on the joint and several security of two or more tenants, its amount shall not, without the special sanction of the Commissioner, exceed—

(1) in the case of occupancy tenants, twice the sum of their annual rentals;
2) in the case of ordinary tenants one-and-a-half times the sum of their annual rentals.

"Interest upon loans shall be at the rate of *one anna in the* rupee, or $6\frac{1}{4}$ per cent per annum. But the Chief Commissioner may, on special cause being shown, sanction the granting of loans at a lower rate of interest, or even without interest. The period fixed for the repayment of loans shall not be longer than 10 years. Ordinarily loans made for the purchase of seed should be repaid from the crops produced from the seed; and loans made for the purchase of plough cattle should ordinarily be repaid within three years at most. The dates fixed for payment of instalments should usually be those fixed for payment of land revenue. When loans are not repaid on the dates fixed, interest at $12\frac{1}{2}$ per cent is chargeable, at the discretion of the Deputy Commissioner, upon all overdue instalments of principal and interest, or of principal where a loan is made without interest. When any portion of a loan made under these Rules is found to be irrecoverable, a special report must be submitted to the Chief Commissioner, through the Commissioner. A register of loans made under these Rules shall be maintained in each tahsil in Form I. (appended), a separate page being alloted for each loan. Annual statements of loans and collections shall be submitted *to the Chief Commissioner*, in Forms marked I and III, by Commissioners *on the* 1st of June, for the year ending *on the* preceding 31st March. Deputy Commissioners shall submit the statements to Commissioners on 1st May."

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THE report on the prospects of the wheat crop in the North-Western Provinces and Oudh, for *the month of* January, is as follows:—"The wheat area in the United Provinces is returned for January at 5,208,652 acres, which is less than the December estimate by 323,518 acres. The explanation of this large difference, is that the January area has been obtained by patwaris' field inspections, whereas the December area was an estimate based on the increased width of the rabi sowings generally, and in the principal wheat districts of Meerut and Rohilkhund, extensive areas, which were supposed to be under pure wheat, have been on inspection found to be under mixed crop, and therefore excluded from the forecast. Taking 100 to denote normal, the area now under wheat in the United Provinces stands at 104. The rain-fall of January was not sufficient in the Agra, Allahabad, Jhansi, Benares, and Lucknow Divisions, but over the rest of the provinces it has materially improved the prospects of the crop. Damp cloudy weather has caused slight rust, and hail has here and there done some damage. Adopting 100 to denote full average, the condition of the crop is as follows:—1,584,687 acres at 100, 649,353 acres at 90, 2,111,557 acres at 84, and 863,055 acres at 75.'

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On the 30th of December last the Government of Madras had sent a telegram to the Government of India on the subject of the scarcity at Bellary, and commencement of the earth-work of the Guntakul-Hindupore railway. The reply received was that no funds will be available for some time to come; but if the commencement of earthwork for relief purposes be indispensable, the Madras Government are at liberty to proceed with it provincially, under paragraph 8 of the Resolution, in the Financial Department, No. 3353, of 30th September 1881, and will be recouped under the rules established for such cases whenever the line can be regularly started for construction as an Imperial work. On the 22nd January, Mr. Cotton, Acting Collector of Bellary, writes to say that the migration from villages in the Bellary and Alur taluks is increasing, and that the people are leaving in large numbers in search of employment. They are reported to have gone to the Adoni and Hospet taluks of this district, to Kurnool, the Nizam's territory and Mysore. In a report received from the Tahsildar of Bellary, it is stated that 4,775 men, 3,193 women, and 2,178 children have already deserted, and that the people are preparing to go in still larger numbers. Similar information is transmitted weekly by the police, and there is no question that a general movement in search of work has set in throughout the taluks of Bellary and Alúr, which have been most seriously affected by the drought. Elsewhere the situation is not so grave. The collector had just completed a tour round the district, and could testify to the fact that the hungari crops are a complete failure throughout the black soil tract, and will be scanty on the red and mixed soils. The harvest of mungari crop is done, and he fears that the wanderers will not be able to find work in connection with agricultural operations anywhere, and will eventually return to their homes disappointed and enfeebled by privation. Under these circumstances he earnestly pressed upon Government the necessity for starting the Guntakul-Hindupore railway works without further delay. The Madras Government lost no time in wiring to the Supreme Government the critical state of the district, and in reply was empowered to spend whatever sum was urgently needed on relief works Hindupore railway, out of the balance of 20 lakhs which the Government of India, in the Finance Department, directed them to keep. Arrangements have therefore been made for placing funds at the disposal of the Public Works Department, from the Provincial balance.

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Herr W. Burck, Assistant Director of the Buitenzorg Botanic Gardens, Java, has written, as an appendix to the report on these gardens for 1882, a most elaborate memoir, embracing all that is at present known of the apparently large number and great variety of the trees which produce the gum called gutta-percha. The gum varies in quality as the trees do in species (some of them appear to be figs), and the soil and conditions suitable for the growth of gutta-yielding trees vary, as in the case of India-rubber trees, from clay, loam, and sand to swamp. The *Tropical Agriculturist* believes that there are some of the gutta-percha-yielding trees in the forests of Ceylon, and others of the species proved to be most valuable can be introduced there; but it is in the vast forests of Borneo, Java, and the islands of the great Eastern Archipelago generally, that scope is afforded for identifying the trees and preserving them from extermination. The difficulty of identifying the gutta trees is increased by the small size of the blossoms, by the fact that blossoms and fruits do not co-exist on the trees, and the trees themselves are, when full grown, very tall. The natives who make their living by collecting the gum can give but vague information, their accounts of the number of trees they fell to secure a picul of gum (133⅓ lbs.) varying from 100 trees to 250. Herr Burck believes that the major portion of the trees which produce gutta-percha are as yet unknown to science. There is, therefore, wide scope for research by him or some other naturalist. The most varying products go into the market by the same name, and are often mixed together, only to be separated by an expensive process before being used to coat cables. Herr Burck promises further information at the conclusion of his investigations in Padang country.

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In the memorandum published by the Government of India on the 20th January from the information then available, it was stated that, in respect of over eighteen million acres, or 9-13ths of the gross wheat area of India (including Native States), the condition and prospects of the wheat crop were on the whole up to the average, and that a bumper crop might be anticipated in the most important province of all—the Punjab. It was also anticipated that the wheat crop in Rajpootana and the Central India States was quite up to the average both in area and condition. The anticipations thus formed are borne out generally by the later information which has now been received. In the Punjab, prospects which were excellent in January continue unchanged, and the season is reported to be most favourable. In the North-Western Provinces and Oudh, more accurate measurements have shown the area under wheat to be about 5¼ instead of 5½ millions of acres, as previously supposed. The benefit expected from the January rains has been realised throughout a great portion of the province. About 30½ per cent of the area under wheat is expected to yield a full average crop, about 12½ per cent, a nine-tenths crop, about 49½ per cent, a four-fifths crop, and about 16½ per cent, a three-quarter crop. In the Central Provinces, where the acreage under wheat is believed, though on somewhat uncertain data, to be below the average, prospects are generally excellent, and a full crop is expected on the greater part of the area sown. In one district only is less than a five-eighths crop anticipated. In the Bombay Presidency, prospects are good in Sind and excellent in Guzerat, where the area under wheat is greater by nearly one-half than usual, and where much benefit has resulted from the December rain. In the Deccan, where the area sown is normal, the crop has, except in the Khandesh district, suffered from rust. In the Southern Mahratta country, the prospects are unsatisfactory, and in Kaladgi, the crop is reported to have failed generally. The report received from the Berars shows the area under wheat, though larger than usual, to be less by about 25,000 acres than was anticipated. The prospects of the crop are satisfactory. A special report received from Cashmere states the area under wheat to be nearly half-a-million of acres, on which a full crop is anticipated.

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At the recent half-yearly meeting of the Colonial Bank the Chairman, Mr. H. H. Dobree, said that there had been a number of most desponding—and, as he thought, over-desponding—letters from the proprietors in the West Indies and other sugar-producing colonies, stating that the cultivation of cane sugar could never be carried on again at a profit; and those letters had naturally frightened persons as to the future of the Bank. As regarded its future, however, he would say that the West Indies had passed through, and had recovered from, quite as severe a crisis as they were now passing through, and they had been fairly prosperous, at least, for the last 15 years. The present great fall in the price of sugar was in the main caused by the unduly fostered production of beet—fostered unduly by bounties—and to such an extent had that production been encouraged, that the sugar had been forced down owing to the enormous amount which had been produced beyond what the consumer could take, to as low as £10 per ton. That price was stated, by those who were fully competent to judge of the question, to be £5 a ton below the price for which sugar could be produced in any part of the world, and under the most favourable circumstances. That was a state of things which could not last long. It was impossible that such an article as sugar could long be produced below its cost. The beet interest was suffering quite as much as, if not more than, the cane sugar interest. In the cane sugar interest, especially in the West Indies, there was every prospect of a reciprocity treaty being concluded with the United States, which would enable the States to absorb the whole of the crops of the West Indies, and, he had no doubt would be of immense advantage to the West Indies generally. It was believed by gentlemen who had some experience of the management of sugar estates, that although possibly in some of the smaller West India islands cane might go out of cultivation, yet sugar could be produced as cheap, or even cheaper, in Demerara, Trinidad, and Barbadoes as in any part of the world. Another matter of some importance to them was that the West Indies were not so entirely dependent upon the produce of the sugar cane as they were some ten years ago. Of course, it was their great staple product, but there was a very large production of cocoa, coffee, spices, and fruit—the trade now springing up in fruit with the United States was very large indeed—and this all tended to make the West Indies to some extent independent of sugar.

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THE following report has been received regarding the prospects of the wheat crop in Cashmere :—" The total area under wheat in Jummoo territory averages 560,212 *kamaons*, equal, at eight-ninths of an acre, to 497,966 acres. A full crop is said to reach the total of 20,75,664 maunds, being rather more than 4 maunds an acre. The present is the most promising crop seen for many years, and is therefore expected to exceed the above estimate of a full crop."

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IN December last, says a Madras contemporary, Mr. M. A. Lawson, the Director of the Government Cinchona Department, Madras, represented to Government that he had discovered certain thefts and defalcations in the Nediwuttum Cinchona estates. The Government thereupon directed Mr. Burrows, the District Magistrate, and Mr. R. D. Shortt, the District Police Officer, to proceed to Nediwuttum in order to make a thorough investigation into the whole matter. This investigation lasted for many days, and the books of the whole department were thoroughly examined, the result being that Mr. Hillier, the Superintendent, was charged with criminal breach of trust in respect of certain sums as a public servant, and was committed for trial at the Sessions Court of Coimbatore. During the examinations of the books, it came out that the Manager of the head Cinchona Office at Ooty had also misappropriated certain sums of Government money, and had received bribes from a certain contractor, *viz.*, Isoof Sait. He also was committed for criminal breach of trust as a public servant, and for bribing a Government servant. The case occupied the Sessions Court at Coimbatore nine days. Mr. Hillier was defended by Mr. Cowdell and the whole bar of Ooty. The prosecution was conducted by Mr. Philip Smith, instructed by Mr. Shortt. After a protracted trial the Sessions Judge delivered judgment on the 14th instant. Mr. Hillier was convicted of all charges against him, and sentenced on the first charge to nine months' rigorous imprisonment and a fine of Rs. 60, with an alternative of two months' rigorous imprisonment ; on the second count of the first charge to nine months' rigorous imprisonment and fine of Rs. 50, commutable to two months' further imprisonment ; on the third count of first charge, he was committed to prison for four months and fined Rs. 30, commutable to two months' further imprisonment. On the first count of the second charge, four months' imprisonment and fine of Rs. 30, commutable to two months ; and second count of second charge, two months' imprisonment and a fine of Rs. 5, commutable to one month's additional imprisonment. The Manager, Venkataruthnum Naidoo, was sentenced to two years' rigorous imprisonment and a fine of Rs. 200, or an alternative of one year's additional imprisonment.

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THE *Gardener's Chronicle* writes :—" Our readers are familiar at least with the reputation of Coca, or Erythroxylon Coca, the leaves of which are used as a stimulant, like tea or coffee, and which allay hunger, and avert the sense of fatigue. This much has been known for years, and was put to the test by the late Sir R. Christison. Its properties were supposed to be due to a substance identical, or nearly so with *thein*, the active principle of tea and coffee. Latterly, this principle has been isolated, and has been found to possess such anæsthetic properties as even to render the eye insensible to touch. Its use in surgical operations is, therefore, likely to become very important, and to be extended to tooth-drawing and other minor surgical operations. At present, its high price forbids more than experimental use, but the results have been so uniformly successful, that there is little doubt that, as the demand increases, the manufacture will be extended and cheapened." The Secretary of the Madras Horticultural Society states that " *Eyrthroxylon coca,* with its near and indigenous relative, *Erythroxlyon monoginum* (*Sethia indica*) grows freely in the Society's gardens."

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THE report for January on the prospects of the wheat crop in the Central Provinces, is as follows :—" The northern district received frequent showers of rain during January, and their prospects have improved ; Hoshungabad alone estimates an out-turn of less than ten annas. Damp weather has led to some, but not much, fungoid disease in the southern districts. Prospects continue excellent, and a full crop may be expected on a large portion of the area sown. It has been impossible as yet to obtain returns of area which are in any way reliable."

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WE learn from a home paper that, through advancing years and failing health, Professor John Wilson, who has for many years sustained the dignity of the chair of Agriculture in the Edinburgh University contemplates resignation at the close of the present session, two months hence. The Professor's shoes will not be easily filled. His ideas on the practice of agriculture did not chime in with those of Scotch agriculturists in every particular. That was hardly to be expected, seeing that his knowledge of practical agriculture was largely acquired in the southern counties of England. By his students, Prof. Wilson was, and is, much esteemed, and in the celebrated educational establishment in which he has so long had the honour of a chair, he was highly respected, as is evidenced by the fact that he has for a considerable number of years acted as secretary to the Senatus. Speculation is already rife in certain quarters as to who his successor should be. Of the several probable candidates who have yet been named, the two that have been received with most favour are Dr. Aitken, chemist to the Highland and Agricultural Society, and Professor Wallace, of Cirencester.

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THE report for January on the prospects of the wheat crop in the Berars, is as follows :—" Area under wheat 819,054 acres, two per cent above the average, which is 803,055 acres, for the Province. The crop is progressing favourably. The late rains have not been so injurious as was feared. An out-turn of twelve annas is expected from the present state of the crop."

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MR. JOHN HUGHES, the eminent chemist, writes to the *Tropical Agriculturist*, published at Colombo : " I am glad to hear tea is progressing so favorably, but I agree in thinking it most unwise to pull up good coffee trees to make a tea garden. If a change is desired, why not do so gradually, planting tea between the coffee; and thus protect the land from exposure to tropical heat and wash ? After my analyses of the Indian cinchona soils, which were so rich in nitrogen, I feared your Ceylon soils would not do generally for cinchona, being too poor in organic nitrogenous matter, but for tea I have every hope, and my friends in Mincing-lane now speak most favorably, very different from what I heard in 1878 on my return from Ceylon, when planters had but little experience in preparing tea."

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A HOME contemporary says that of the companies alread formed to work the gold fields of the Transvaal, it cannot b said that any one of them has as yet proved successful, though the prospects of each seem to be brighter just now than at any other period of their history. The difficulties between the Lisbon-Berlin Company and Mr. Gwynne-Owen having been settled out of court, the manager and directors will now be in a position to devote their sole attention to the development of the mine. It is also said that the directors of the Spitzkob Company have decided to pay the amount of the award into court, and at once get possession of Silo Hill, so that the legal proceedings will go on contemporaneously with the working of that part of the property by the company's manager. With regard to the Transvaal Gold Exploration and Land Company, the directors have issued a circular stating that advices just received from Mr. Williams, by cable, state that the quartz crushed during the month of December amounted to 413 tons, and yielded 130 ozs. of gold, which is now in transit. As last reported, the quartz at Ophir Hill has deteriorated, and although Mr. Williams noted a slight temporary improvement, he now telegraphs to the committee that he has been compelled to stop the works there owing to the veins producing too small a quantity of payable quartz. The committee regret to state that the results so far obtained from the crushings of the stacked quartz purchased from the diggers have not satisfied their expectations, nor the representations made on this head on the purchase of the property. From the assays of samples, said to have been fairly taken, this quartz was expected to yield nearly 6 ozs. of gold to the ton ; but it has not yielded more, on an average, than 10 dwts. per ton, and the committee fear that the total quantity will not exceed 4,000 tons. Mr. Williams reports that frequent assays of the "tailings" show that practically little or no gold is lost by the gold-dressing machinery sent from England. The machinery to be worked by water power at Brown's Hill was expected to be at work on January 6. Work had been commenced on an hitherto untouched reef, called "Glenister's," from which Mr. Williams had obtained better samples than from any other workings since his arrival. The company possess four other farms besides those on which Brown's Hill and Ophir Hill are situated, which have not yet been thoroughly prospected, and the committee are about to take means to have the reefs alleged to exist upon them, explored. The committee hope to hold the general meeting as soon as replies have been received from Mr. Williams upon some questions raised by the existing circumstances, but this cannot occur earlier than the month of April.

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THE position which Indian Tea has attained in the London market during the last decade, must be a source of great satisfaction to them who have embarked large capitals in the industry. From the annual circular published by Messrs. Gow and Wilson it appears that between 1874 and 1884 the increase in consumption of that article was just 350 per cent., while there was a corresponding and considerable decline in the deliveries of China teas. The production for export of the latter seems to have reached its highest in 1879, when the speculative rise in prices flooded the market with such an amount of re-dried rubbish as to disgust the London retailers, and this led to increase the popularity of the Indian growth, as Messrs. Gow and Wilson very properly remark that China being a producing and consuming country, there is a temptation for re-drying the leaves once used, and exporting it to foreign countries. But such is not the case in India, where the consumption is limited, and that too not in the producing districts ; and there exists no necessity for 'doctoring' the tea. Dealers have realized for themselves the fact that for an equal outlay, Indian has been of far more value for the money than the product of the Celestial land. If any further proof were necessary it will be found in the extension of gardens in this country, and the addition the last year or two of Ceylon tea which has been absorbed as fast as the increase in production has taken place. While this is the bright side of the picture, let us turn to the other, and see what experienced men have to tell us in regard to the modifications which the excellence of Indian tea have gone through, and how far we may take a lesson from the deterioration of China teas. Messrs. Gow and Wilson tell us that of late the managers of the Indian gardens have been too intent on quantity, and consequently care and discretion in manipulation have been disregarded. Ceylon, too, is apparently hastening its production at too rapid a rate, and the course of prices has somewhat reflected this fact. For Indian teas the closing quotations of 1884 are the lowest ever recorded. The same quality of tea which less than three-and-a-half years ago was saleable at as high as 1*s.* 6*d.*, is now offered in the market at under a shilling a pound. This does not all result from the events of 1884, though the market has been so seriously depressed by untoward incidents, such as the Oriental Bank failure, and the constant forced sales of the period under review. Dealing with the statistics of 1884, we find that the sales to home consumers have been unprecedentedly large. The average deliveries of each quarter show increases with corresponding periods in 1883, and twice in the year the monthly deliveries were over six million pounds. Consequently, although the arrivals in the calendar year have been some 5½ million pounds more in 1883, the stocks only stand about 2,900,000 lbs. higher than a year ago, and, as teas have been hurried forward in the first half of the season, the arrivals in the second half will be below the figure of the January-June period of 1884.

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To forecast the possible position of stocks of Indian and Ceylon teas at end of June next, it is necessary to examine the crop estimates for the 1884-5 season, the arrivals to date, and balance to come forward, and the deliveries so far, with an estimate of the consumption for the six months to end of June, 1885, taking note that there is now in London a stock of about 27,000,000lbs. of Indian and Ceylon tea in warehouse. The crop prospects were placed at a yield of 66,664,000lbs. in the Indian districts, and as the exports from Ceylon rose from 623,000lbs. in 1882 to 1,523,000lbs. in 1883, it may not unreasonably be assumed that not far short of 2,500,000 lbs. will be available from that quarter in the season 1884-5. This makes a total production from the Eastern dependencies of the Crown of 69,164,000 lbs., and striking off, say, 2,664,000 lbs. as consumed in India or exported to other quarters than the United Kingdom, there would be left an available supply of, say 66,500,000 lbs. Of this supply 42,550,000 lbs. have been already received in the six months ended 31st December last, so that approximately, a further 23,950,000 lbs. has to come.

We have arrived at the figure of 23,950,000 lbs. as the probable amount to be received in the current six months, basing the calculation on the crop estimate, as originally put forward by the Indian Tea Association. Adding this to the stock there is in warehouse, we get a total amount of rather over 51,000,000 lbs. to be dealt with. The next point to be considered is that of deliveries. In the half-year to 30th June 1884, the home consumption was 31,424,000 lbs., and the deliveries were especially heavy owing to the fall in prices, the new half-year was commenced with the lowest level of values yet reached, and there is rather the probability of an increase in the deliveries of the first half of 1885, over the same period of 1884, than that deliveries will either be maintained at the quantities of 1884 or will be less. It seems therefore probable that despite an assumed increase in the supply of 1884-5 over the previous crop year of about 3,500,000 lbs., there will not be much more stock at 30th June, 1885, than there was in June last, and there is the probability of the stocks being reduced by smaller arrivals than those estimated, inasmuch as the available supply for the United Kingdom, is, by recent accounts, reduced very much, in fact estimates of 2,000,000 lbs. to 4,000,000 lbs. less than the 66,664,000 lbs. of Indian growth are now current.

INDIAN WHEAT.

IT was shown by us a few days ago, that wheat may be successfully grown on the same land year after year, provided it gets a yearly dressing of half a maund of nitre, per bigha. The best time for the application of this dressing is when the young wheat is six or eight inches above the ground. It is necessary to mix the nitre with five or six times its weight of ashes, lime, or other powdery matter, to secure its even distribution, as half-a-maund of nitre is much too small a quantity to be distributed evenly over such an area, by itself. A light shower diffusing the manure over the wheat, immediately after its application, is very beneficial to the crop : but as showery weather can never be depended upon in India, in December or January, irrigation just sufficient to moisten the surface soil, from six to eight inches deep, and no more, is very desirable. Any excess of water acts injuriously, by washing the nitre, which is a very highly diffusible salt, out of reach of the roots of the wheat.

In England, our farmers ordinarily use ammonium sulphate, or nitrate of soda, for top-dressing their wheat, nitre selling at much too high a price for ordinary agricultural use. Indian agriculture has here a great advantage, as nitre is not only cheap, but can be manufactured by the poorest Indian peasant, if he cares to do so. The old broken down mud-walls that disfigure almost every village, yield ready-made nitre in almost any quantity. We thus require neither retorts, nor furnaces. The ordinary every-day appliances of Indian peasant life, suffice for the purpose. The manufacture of nitre has been practised in many districts of Bengal for centuries, though not for agricultural purposes, and the Indian peasant manufacturing nitre, for export as saltpetre, is one of the common sights in many of our districts.

The presence of nitre in old mud structures makes their crumbling walls, moreover, an admirable powder for mixing with, and increasing the bulk of, the actual nitre used. Our recommendation is not, be it observed, founded on theory alone. Positive experience in wheat-growing, in certain districts of Bengal, has disclosed the fact that our cultivators do use this very material, and as top-dressing, without knowing *why* it succeeds. Any one having much acquaintance with village life in Bengal, will probably have observed the use by the ryot of pulverized old walls as top-dressing for his kitchen garden. As a fact, it is widely practised and well known all over the country. The practical value of nitre in this shape is, we say, well known to the people. It is the scientific use of it that has to be explained, and made familiar to the ryots, to make them take an intelligent interest in the practice, and to further its extension and more systematic use on their lands. Of all common plants, cereals, especially wheat, require the most nitrogen in their food, and they are dependent on the soil for it. It is an apparent paradox of agricultural chemistry, that while the cereals such as wheat, barley, oats, rice, maize, &c., contain only half as much nitrogen in their composition as the leguminous crops—peas, beans, &c., the former require more nitrogen in their growth than the latter. Hence it is, that the cereals derive more advantage from nitrogenous manures, than leguminous crops. The use of ammonium sulphate, or nitrate of soda, as top-dressing for wheat in England, is resorted to only for the nitrogen which they contain, and that nitrogen in the most available form. In the absence of these two chemicals in India, or as they are called, artificial manures, we have ventured to suggest nitre, as the latter seems to be the only form in which nitrogen can be supplied to Indian wheat. We must not be understood to mean for a moment, that farm-yard manure is not good for wheat. On the contrary, it is one of the very best manures at the farmer's command, for all crops whatever, wheat included. Our reason for suggesting nitre instead of farm-yard manure in India is, that the latter can be ill-spared by the peasant, since he has no other fuel; and that nitre has a higher manurial value for wheat, and is applied with more economy of time and capital. Ammonium sulphate and nitrate of soda are known to produce the largest yield of wheat, in the shortest time, and with the least amount of loss, and nitre we think is likely to do the same. As we purpose, however, to take up the whole subject of manures in future issues of this journal, we pass on to the consideration of another question.

The stock assurance of a certain class of writers concerning agricultural progress in India is, that the ryots have nothing to learn from agricultural reformers, and that even if they had, they are too poor to adopt a higher style of farming. Now this is evidently the old and vicious process of moving in a circle. The poverty is exaggerated, we believe, in so far as many districts of Bengal are concerned, but if we allow that they are very poor, there is the greater reason for an attempt to better their condition. Instead of being resigned to the inefficiency of old methods, which means floating down the stream, the Indian ryot should be urged to make head against it, and to progress. The very writers who move in this same circle, claim for the peasant the credit of perseverance, skill, and strong common sense: and justly. But we require nothing more from the peasantry of India, than the exercise of their strong common sense, perseverance, and skill. The ryot is not so poor that he cannot invest Rs. 2½ in nitre for a bigha of his wheat land, to reap twice that sum in a few months time. Once made to understand the nature of the investment, he will know where to find the money. Forty years ago, English farmers knew as little of scientific farming as the ryot does to-day. We remember well the opposition which the scientific lecturer used to encounter from the practical, prejudiced, stubborn farmer in the English counties. Where is the opposition now?

CINCHONA PLANTATION.

Mr. John Hamilton who, from his practical experience both in Ceylon and Mincing-lane, is an authority on the subject of Cinchona growing, has done good service to those engaged in the industry by the compilation of valuable statistics respecting the production and consumption of bark throughout the world. In a pamphlet just issued he offers some useful advice to Cinchona planters in Ceylon on the subject of bark preparation and selection. He was led to embody his opinion in the form of a book owing to the fact that since Mr. T. C Owen's work was written, prices have fallen to a point that makes it a matter of considerable importance as to what bark should be harvested at all, and if harvested, whether it would not be best to accept whatever price is obtainable locally in preference to shipping at a loss. Mr. Hamilton also discusses the subject whether more money might not be made out of the low-class bark that is constantly coming forward. When the growing of Cinchona was first taken in hand as a commercial industry, hardly any attempt was made at preparation, for a simple reason, that there was a lack of experience, nor was there any necessity for it, for competition was brisk without it, prices were satisfactory, and the profits to the planters enormous. But things have changed since, and as Mr. Hamilton observes—"The progress made has certainly astonished everyone; for not only has Ceylon become the chief cultivated bark-producing country in the world, as regards quantity, but she is sending into the London markets parcel after parcel of renewed growths, with analyses scarcely conceived in the days of the best South American Calisayas. Just at present the price has fallen a good deal below what we may expect in the future, owing to various causes as unexpected as they are disheartening; but the position of the article is good, and men will do well to learn all they can to make the utmost of the fortunate prize which has fallen into their hands, and which is steadily tiding many on to renewed prosperity, especially if, as it seems probable, the yearly average export of the future is not to be maintained."

The following quotations are some of the practical hints on the subjects under various headings:—There still seems to be much uncertainty regarding the kind of quills required by the trade, and many have suffered both disappointment and loss by sending home renewed quills, young papery quills, quills from varieties undesirable for the purpose, such as calisaya, pubescens and hybrid, which would only be bought on analysis. All these should have been shipped in bales as stem chips. My impression is that it only pays to harvest as quills, original succirubra, from four-and-a-half to five years old at the earlier, and then only from trees of stout growth. The quills should be 2-ft. in length well assorted, and quite even. They should be packed in cases, and care should be taken that no small pieces are inserted to fill up crevices. Good officinalis quills have brought high prices, but I think other ways of harvesting officinalis are more profitable. The tops of the trees, where the bark is naturally weak scarcely pays to harvest as quills, and should, therefore, be broken up into stem chips. Stout, clean, even, well assorted 2-ft. natural succirubra quills always command a good price, but they must be packed carefully to avoid getting broken. The more silvery the better, and the lichen should in no case be removed, as it apparently gives them a traditional value in the eyes of druggists. On no account should renewed barks be shipped as quills.

"Calisaya.—With one or two exceptions (notably Stellenburg and Penmynydd) this bark is by far the most unprofitable kind grown in Ceylon, and could with advantage be replaced by something else. When harvested, it certainly should not be quilled.

"Original Shavings, if not taken from too young trees, seem to realise paying rates. Care should be taken to keep them clean and free from twigs, and parcels should not contain less than 500 lbs.

"Renewed Shavings.—I have noticed parcels with this designation that have contained as much *natural* as *renewed* bark in them, in addition to twigs and extraneous matter; the analysis naturally corresponding with the sample. On the whole, however, this class of bark is better prepared than any other that comes on the market with the exception of renewed chips.

"Original Chips.—In these parcels I would suggest more assortment, and the winnowing out of inferior stuff, which lowers the analysis and does not really pay to ship. A large shipment of chips would frequently stand a good deal of picking over before leaving the estate.

"Renewed Chips.—In most cases the preparation of these, both of officinalis and succirubra, has been very good. They have evidently been more generally adopted than shavings in the past year, owing to coppicing I conclude, and prices on the whole for this class of bark, have been satisfactory.

"Root.—The price for root continually varies. When supplies are heavy, root is the first to fall; if supplies are light, root immediately rises in value. Fine bright succirubra root sells readily, and prices for this description are well maintained. The process of cleaning suggested in Mr. T. C. Owen's work is not always carried out, *viz.*, 'to wash the root in running stream before taking the bark off,' or we should not hear of manufacturers giving up buying root on account of the dirt. It must pay to thoroughly clean root bark, and that is a point worthy of attention in view of the falling off in supplies from Ceylon.

"Branch Bark and Mixings.—Both officinalis and succirubra mixings, if of fair quality and in good order, are most profitable shipments, yet it is in these parcels especially that the valueless twigs and extraneous matter are so often found. What I describe as 'mixings' generally contain some shavings, both renewed and original, some chips, original mostly, and good stout branch, &c.; eliminate from these the twigs and the rubbish, and you have a very useful parcel. The extra expense and attention to these lots would give a nett result considerably higher than that obtained for most of these shipments at present, and would, I think, well repay both.

"Twigs.—At present rates it does not pay to ship succirubra twigs, and growers should only harvest them for the local market. Officinalis and ledgeriana twigs could be shipped if it is known they contain a good analysis, but it must be borne in mind that a 1 per cent analysis of twigs is not equal to much more than a ½ per cent analysis for other barks, but let them on no account be mixed in with good bark.

"Ledgeriana.—Very little of this variety has, at present, come on the market. Original shavings, so far, have sold better than renewed, but, perhaps, after the first renewal the analysis may improve, as has been the case with succirubra—the fourth and fifth renewal showing the best results of all.

"Quantity.—No assortment should contain a less quantity than 500 lbs., otherwise it runs a chance of not being tested by the buyers. Quills, and very fine lots of renewed barks are an exception to this rule.

"Markets.—I think it will be found that *careful preparation* of Cinchona bark will decidedly command the special notice of buyers towards those marks where such attention is continuously bestowed."

THE DOOMRAON AGRICULTURAL EXHIBITION.

(FROM OUR SPECIAL CORRESPONDENT.)

Doomraon, February 19.

Never before, in the memory of the oldest inhabitant of the district, has Doomraon worn such a gala appearance as on the present occasion. The *élite* of the European and Native communities of Behar have come together from distant parts, not with the object solely of joining in a general holiday, but to realise for themselves the material resources of the district, and its productive capabilities. Every department of the Exhibition was as complete as it could possibly be, and it would be invidious to any one for special praise. I cannot, however, pass over the show of vegetables and flowers without a few words of comment. They are without exception the very best of their kind, and beyond the expectation of the most sanguine in such matters. For country potatoes, Mr. Stalkert and Kurreem Bux carried off the 1st and 2nd prizes, respectively. For sweet potatoes (red), the Collector of Bettiah took the first prize, while the Buxar Government Estate walked off with the first prize for yams. Dr. Price and Mr. Inglis divided the prize equally between them for tomatoes. Baboo Hunuman Pershad's exhibition of garden peas, sent all the way from Chunar, carried off the palm. For cauliflowers, Mrs. Tweedie got the 1st prize, and Syed Fazl Imam the second. For cabbages, the sub-divisional officer of Sasseram took the 1st prize. The Maharaja of Bhugwanpore and the Maharaja of Doomraon carried off a number of prizes, especially for celery, a *dalli* of European vegetables, best fruits of the season, a collection of foliage plants in pots, &c., &c. The bouquet of cut flowers, exhibited by Col. Heywood, was particularly good, the Maharaja of Doomraon following suit. For another bouquet of cut flowers, which was also very good, Mrs. Nolan, of Arrah, took the first prize, and Mrs. Tweedie the second. To the latter was also awarded the first prize in floral ornaments, which required to be seen to be admired.

Plough Competition Awards.

The following notes recorded by the judges appointed to decide upon the comparative merits of the various ploughs exhibited at the Doomraon Agricultural Exhibition, will be read with interest by all concerned with agricultural improvements. The judges were Mr. W. F. Burrows, (Messrs. Burrows, Thompson and Mylne, zemindars of Behar, Shahabad); Mr. D. J. Macpherson, of Arrah, and the Hon'ble Harbans Sahai, Secretary of the Behar Landholders Association, whose local influence and repute should obtain wide adoption of the ploughs which their judgments have approved.

Report.

Doomraon, February 20.

It had been intended to conduct, during the Doomraon Exhibition, ploughing matches under conditions which would put to an exact test all the good qualities which each plough, sent to the Exhibition, possessed, but it was found impracticable to proceed with the trials in the strict manner originally intended owing to the want of a sufficient number of uniform yokes of trained bullocks and of ploughmen accustomed to such ploughs. The judges were, however, able to form an opinion of the general character of the work of each by setting it actually to work, but were also guided in their final awards by a consideration of its price, simplicity, repairability, adjustability to different sizes of bullocks and the like, and by the opinions expressed by the cultivators who were present and the men who actually drove the ploughs. The trials took place on the second and fourth days of the show on a light loam, locally known as *bangar*, in the presence of a large concourse of peasants. The judges have agreed in awarding the following prizes:—

A. Prizes, for Improved Ploughs

1st Prize, Rs. 50.

The Kaisar, sent from the Cawnpore Government Farm, price ... ... Rs. 6

2nd Prize, Rs. 25.

Avery's Hindustan, No. 1 (exhibited by Messrs. Burrows, Thompson, and Mylne, of Behea) pride Rs. 15

B.—Prizes, for Country-made Ploughs.

1st Prize, Rs. 28.

Gavin Jones' Keishtkar plough (exhibited by Messrs. Burrows, Thompson and Mylne) price Rs. 7

2nd Prize, Rs. 20.

The Saidapet Government Farm plough (exhibited by Messrs. Burrows, Thompson and Mylne) price Rs. 6

It is worthy of observation that all these ploughs were drawn with apparent ease by a pair of weak bullocks, brought by one of the Nasrigunge Government ryots, who asked for them to be tried with the ploughs, thinking that they would prove unable to draw them. The soil, however, as already remarked, was comparatively light.

The object of the matches was not to show the cultivators what individual plough is recommended for their adoption, but to give them an opportunity of seeing what can be done by the addition of a soil-inverting apparatus, and the kind of plough which might in time be modified and simplified to suit the requirements of Indian husbandry.

As two first prizes cannot, by rule, be assigned to the same implement, the first prize for country-made ploughs has been given to the "kashtkar" instead of to the "kaisar."

A wooden "Duplex plough," sent from the Cawnpore Government Farm, failed to invert the soil as effectively as the "kaisar," and had a less convenient form of stilt; but it had the advantage which none of the rest of the soil-inverting ploughs possessed, of having besides the share, with iron mould board, similar to the "kaisar," an ordinary moveable country share which is better adapted for covering the seed furrows than a soil inverting one. This obviates the necessity for the cultivator's keeping two ploughs; and the price which is not marked on the plough is understood to be only Rs. 4-4, in all.

Miscellaneous Items.

The first batch of emigrants from Madras to British Guiana left Madras last week, for Demerara, by the British ship *Bruce*.

The Japanese papers state that the total value of the exports from Yokohama for 1884 was 21,416,961 yen, and of imports 19,039,443 yen, making a total of 40,456,404 yen.

The Lieutenant-Governor and Chief Commissioner, N.-W. P., has directed that oil-seeds imported into the Agra Municipality shall be exempted from payment of octroi, with effect from 1st April, 1885.

The *Ceylon Observer* says that Mr. D. Mackay has just returned from Perak, and the result of his explorations there, is stated to be the discovery of a large and valuable deposit of tin ore in the land secured by him in conjunction with Mr. G. H. D. Elphinstone.

The Revenue of Indian Sea and Land Customs, excluding the Salt revenue, for the first ten months of the current financial year, amounts to Rs. 68,58,000. For the corresponding period last year, the amount was Rs. 81,78,000, and the deficiency shows to what extent trade has fallen off during the year.

A proposal has been revived for a floating dock at Colombo. The construction of a northern arm for the Colombo harbour from the rocks at Mulwal Point is strongly urged upon the Colonial Government. The work is necessary to stop the erosion of the foreshore at Mutwal, and the wash of salt down the coast into the harbour.

The late Mr. P. A. S Sheppard, who died of typhoid fever at Coimbatore at the early age of twenty-one, was the son of Mr. G. F. Sheppard, Bombay Civil Service. He was trained at the Forest School, Nancy, France, and joined the Madras Forest Department in November 1884, as Assistant Conservator of Forests, 3rd grade, and was posted to Coimbatore, where he was very popular.

The official reports about Mysore are very disheartening. The failure of the past season's rain is causing great scarcity of water all over the province, and grain is selling at famine rates. Already large quantities of *ragi*, the staple product of Mysore, are being imported from Madras. Famine-stricken objects from the agricultural districts are seen in the Bangalore streets. The heat is trying.

M. Lauth, the superintendent of the porcelain factory at Sevres, is said to have discovered a new porcelain, which is far superior to the famous old Sevres. After ten years' experiment and investigation, he thinks he has produced a porcelain identical with that of China. Not only does it lend itself to artistic decoration, but it takes all kinds of glazes, and surpasses in beauty the colours obtained in China.

They had better look out for serious trouble at Thana. The forest rules, or rather the mode of enforcing them on the populace, have very nearly maddened the aboriginal tribes. It is no use telling such people that forests are preserved for their own good. They only know that they are being deprived of what they have had a right to from time immemorial; and they object to being kept out of their natural rights, in fact being starved to death, in order that provision may be made for their grand-children.

The *Ceylon Observer*, in noticing the success of Mr. Walter Keess at the Royal Agricultural College at Cirencester, remarks: "When we were in Madras in December 1877, we had the pleasure of meeting Dr. Keess, a Eurasian gentleman, who by sheer industry has raised himself from a humble station to be head of the Medical College in that town. His sons appear to be following in his footsteps. . . . . We believe this is the young gentleman who was spoken of last year as to be the Superintendent of our Agricultural College. We hope this may be realised."

South African ostriches are laying eggs so abundantly that only a small proportion can be hatched. One gentleman says "that he had 300 eggs lying in his camp last week. Several have been sold on the Graaff-Reinet market for culinary purposes at 9s. per dozen. This ought to bring pancakes, pudding and omelettes within the reach of all, for one ostrich egg is, on the average, equal to a dozen hen's eggs. The incubator may be considered exploded. It is known to have filled the camps with Cape chicks of impaired constitutions or deformed bodies; and, now that the rage for buying ostrich chicks at high prices, irrespective of 'antecedents,' is past, the incubator is stowed away with the old lumber."

The business of importing Australian cattle into Singapore, for the purpose of supplying the Settlement with good beef, is making rapid progress. It will be observed that Mr. Mcleod, who is at present the only person engaged in the trade, has received a further supply of bullocks by the *Natal*, and is ready to fulfil all orders that he may be favoured with. Mr. Osborne, who inaugurated this trade, is at present in Australia, but it is possible he may return shortly with some more cattle. Competition is healthy in every business, and there is plenty of room for both of the enterprising caterers.

Some little time ago, a reference was made to certain cases in the Rawal Pindee Division, in which owners of land had suffered no little inconvenience and even hardship from the operations of the Forest Settlement. The matter has not escaped the notice of Government. Inquiries have been made, with a view to ascertaining whether it would not be possible to provide expropriated owners with lands elsewhere, or to set aside for them some portion of the protected forests; or else to so modify the forest arrangements, as to mitigate the hardships of these expropriations without material injury to forest conservancy.

The Secretary of State for India has approved of the proposal of the Bombay Government to establish a Veterinary College in Bombay, at a monthly cost of Rs. 1,520, of which amount Rs. 960 and Rs. 300 will be paid as salaries, respectively, to the Superintendent and Assistant Superintendent. It is hoped to get the College and the Hospital attached to it started and in working order by the 1st April next. The Bombay Municipal Corporation have been asked whether they are prepared to bear a share of the expenditure required for the maintenance of the proposed College, and, if so, what contribution they are willing to give.

The total value of the foreign trade of the province of Sind for the year 1883-84 amounted to Rs. 5,20,31,319, or 34·07 per cent more than the previous year. In the coasting trade, which amounted to Rs. 3 78,59,281, there was also an increase of 18·45 per cent. Thus the aggregate trade of the port of Kurrachee during the year under report reached Rs 8,98,90,600, being an increase of 27·02 per cent over that of the previous year. The increase in merchandise amounted to Rs 16,09,009 and in treasure to Rs. 6,05,074. The total value of stores imported from foreign ports was Rs. 88,676. The exports of Indian products, chiefly food-grains and oil seeds, amounted to Rs. 3,53,62,485. This, it is satisfactory to observe, is an increase of over 110½ lakhs of rupees on the previous year, and is due to the progress of railways in the direction of cotton, grain, and seed producing districts, and to the reduction of railway rates for the carriage of merchandise. The large and increasing export trade has improved the condition of the cultivating and labouring classes, and led to an increase in the import trade also. The trade with the United Kingdom showed an increase of 35·87 per cent.

Selections.

CANE CRUSHING MACHINES.

From E. C. Ozanne, Esq., Director of Agriculture, Bombay, to J. Nugent, Esq., Secretary to Government, Revenue Department, Bombay,—dated, Camp Gadag, District Dharwar, 8th January 1885.

Sir,—As desired in Government Resolution No. 3067, dated 15th April 1884, I have the honour to report that I have carried out experimental trials of several cane crushing machines. I have not yet had an opportunity of testing the machines of the Bhadgaon Farm to which Mr. Robertson drew attention, but a copy of this report will be sent to Mr Stormont, who will be able to compare his results with those now recorded.

2. I have experimented with the following:—

1.—The ordinary 2-roller wooden mill of the country.
2.—An improved 3 roller cast iron mill with iron frame, invented by Mr. Subrao Raoji Chowhan, owner of a cast-iron foundry in Adivar Peth, Poona.
3.—The single-squeeze Bihia mill, patented by Messrs. Thompson and Mylne, with two rollers, 8″ × 10″.
4.—The double squeeze Bihia mill, with two rollers 7″ × 8″, and one break roll 4½″ × 8″.

3. The Bihia mills were sent to the Poona Show by the Bombay agents, Messrs. Ewart, Latham and Co., and were accompanied by trained hands from Bihia. The prices of the mills were given by these men at Rs. 165 and 171 respectively, but the prices quoted in the catalogue of the Madras agents, for mills answering the descriptions given, are quoted at Rs. 150 and Rs. 160, respectively. It may be that those I tried were provided with steel pinions, but a reference will be required to clear up the points of difference in quoted prices.

The Bihia mill was tried by Mr. Stormont at Bhadgaon. He reported very unfavourably on it. I believe that the firm have improved on their old pattern, for the results about to be exhibited are decidedly favourable.

The Poona mill, Subrao's 3 roller mill, has an iron frame, whereas the Bihia mills have a wooden one. The rollers of the latter are slightly grooved. Those of the Poona mill are quite smooth. This latter mill has for some time attracted attention.

extensively used. It is most undoubtedly vastly superior to the wooden *charak*, and has to a great extent superseded it in the close vicinity of Poona, where the makers are at hand to repair the iron mill.

4. The first trial was made during the Poona Show.

Two mills were worked, *viz.*, Subrao's and the Bihia 2-roller.

For the former, two pairs of ordinary bullocks, with a driver for each pair, are required. Two men feed the machine, one inserts the cane between two of the rollers, the other receives the half pressed cane and pushes it back between the middle and third roller. The mill is placed on the ground, and to receive the expressed juice a hole is dug in the ground into which a large iron or earthenware receiver is placed. This is covered over with boards and one of the feeders sits on the boards. The cane is cut into lengths of about two-and-a-half to three feet, and the cut is made in a slanting direction so as to leave a pointed end for insertion between the rollers. It took a man 15 minutes to prepare 500 lbs. of cane, already topped and stripped. This cutting is quite unnecessary for the Bihia mill.

For the latter, only two oxen are used, working singly at the ends of levers by which motion to the machine is imparted. Two drivers are required, but only one feeder. As there is a contrivance for holding the cane inserted the feeder has ample time to clear away the squeezed cane himself. The machine bites the cane and holds it so that there is no necessity for its being cut into short lengths. In the trial the workers of Subrao's mill kept the bullocks at a pace which they could not have maintained for half a day, the usual time for one set of animals to work. This haste was quite uncalled for. The man in charge of the Bihia mill worked very steadily and deliberately.

Results.

		Subrao's Mill.	Bibia Mill.
Time occupied to squeeze 500 lbs. of topped and stripped cane	...	63 min.	65 min.
Weight of juice extracted	...	342 lbs.	308 lbs.
Percentage of juice to cane	...	68·4	61·6
Number of oxen employed	...	4	2
Number of men employed	...	5	3

It must be noticed also that the juice is received from the Bihia mill in pots placed on the ground easily removable. The time occupied in lifting out the juice from the buried receptacle in the Poona mill is considerable. Fully two men more are required by this latter mill.

This result was considered unsatisfactory by the man in charge of the Bihia mill, and as considerable interest was excited by the trial it was decided to repeat it. An inamdar offered the use of his land and cane, and to provide labour.

The second trial was made after the bustle of the Show was over. Four mills were used ;—

1.—The wooden country mill, worked by two pairs of oxen with drivers, two feeders, and one helper. The cane has to be cut into short lengths. A large hole is dug, large enough to admit the two feeders. The bullocks assigned to this mill were the best on the ground. The pairs assigned to the Poona iron mill came next in quality. Those given to the Bihia mills were certainly inferior, but they were quite good enough.

2.—Subrao's mill.

3.—Bihia single-squeeze mill.

4.—Bihia double squeeze mill.

This last only requires one bullock, one man to drive, and one feeder. In other respects it has the same advantages as the single squeeze mill above described.

The trial was made very carefully under ample supervision, for I was assisted by an European and a native gentleman to watch each mill and to weigh and distribute the cane, and finally to weigh the expressed juice.

500lbs. of cane, topped and stripped and cut into lengths for the two first named mills, were distributed.

Results.

		No. 1.	No. 2.	No 3.	No. 4.
Time ...	...	67 min.	48 min.	69 min.	103 min.
Weight of juice	...	3[illegible]8 lbs.	337 lbs.	346½ lbs.	353½ lbs.
Percentage of juice to cane	...	61·6	67·4	69·3	7[illegible]·7
Number of oxen	...	4	4	2	1
Do. of men	...	5	5	3	2

The pace at which the cattle worked was tested with the following result :—

Number 1 ...	3¼ rounds	per minute.
Do. 2 ...	3 do.	do.
Do. 3 ...	2¾ do.	do.
Do. 4 ...	2½ do.	do.

I had no dynamometer and resorted to a rough method of comparing the power expended on each mill. I found that the ordinary labourer pulled about 60lbs., as measured by a spring balance. The following numbers of men were needed to turn each machine :—

Number 1 ...	7 men	representing	420 lbs.
Do. 2 ...	5 do.	do.	300 ,,
Do. 3 ...	2½ do.	do.	150 ,,
Do. 4 ...	1¼ do.	do.	75 ,,

I must note that owing to haste and hurry on the part of the feeders of No. 2 mill (Subrao's), some juice was spilled in changing the pots On the whole, I thought, that as regards outturn of juice, Nos. 2 and 3 were about equal

Mr. Subrao claimed another trial on the ground that his mill could do better work than this Another field had to be chosen. Here the cane was seventeen months old (that of the principal trial was only one year old). I succeeded in having No. 4 Bihia mill (3 roller) brought to the spot, but the expert had gone. It was fed by a new hand, The results were—

		Time.	Juice.	Percentage.
Subrao's Mill	...	60 min.	365½	73·1
Bihia 3-roller	...	130 min.	322	64·4

In this trial I weighed the refuse cane, which was found to be 138 lbs. and 165 lbs., respectively.

In the case of the Poona mill 365½ lbs juice and 138 lbs refuse=503½ lbs. The small discrepancy was due to not very accurate scales In the case of the other mill 322 lbs. juice and 165 lbs. megass=487 lbs. Here the discrepency was too high. I cannot be sure that some of the cane or juice was dishonestly abstracted. but I cannot consider this trial to have been a fair one to the Bihia mill. The feeder was unaccustomed to it. I cannot be certain that it was set properly. However the result was favourable to the Poona mill.

To sum up.—The Bihia mill, as regards portability, cost of setting up, and cost of working, possesses very great advantages over the Poona mill. It is cheaper, though as noted above, the prices are not exactly known.

As regards construction, the trial could not prove much.

In point of mechanism, the Bihia mill shows best.

The efficiency of the Bihia mill is as great as, if not greater than that of the Poona mill. Mr. Subrao deserves very great credit for his improvement. He admits that at first his rollers showed a tendency to break, but claims that they do not now. The wooden *charak* is a thing of the past, where sugarcane-growers have the power to purchase either of the improved mills, or facilities for hiring. This latter is the almost universal practice near Poona.

It is open to Messrs. Thompson and Mylne to introduce their mills into Poona, and I would throw out a hint that they would benefit by making Mr. Subrao their agent, and, if his foundry is good enough, their local manufacturer. The firm of Richardson and Cruddas, in Bombay, now makes the rollers and iron work. This is their affair, not mine I do not know how far Mr. Subrao would approve of the idea. Mr Subrao charges Rs 200 for his mill, but hires it for Re. 1 a day, bearing all risks. The wooden country mill costs Rs. 35 to Rs. 40, lasts about two years, and is hired for 12 as. a day.

THE PAPER TRADE IN LANCASHIRE.

The information which reaches us shows that the strong competition now going on all over the country is affecting the paper trade in Lancashire, but that there are signs of the struggle being continued. The *Darwen News* of the 3rd instant says :—The paper trade is a business sometimes regarded as a sort of industrial elysium, subject only to slow and almost imperceptible changes as compared with the sudden fluctuations to which the cotton trade, for instance, is liable Such impressions no doubt were justifiable in times gone by, but they are no longer applicable to this trade at all. It is now conducted with as much vigour and energy as any other trade, and as a matter of fact, these have degenerated into a competition which is as fierce and deplorable as that existing in any of the staple trades of the country. In grocery and parcelling papers generally, there has been a further reduction of prices ; to some extent this has been covered by the lower cost of the materials used, so that the paper-maker engaged in this branch is in about the same position as he was a year ago. True, there is not anything like the margin for him there was several years ago, but still by careful management and economising at every possible point, a moderate profit can still be earned It is not so with those engaged in the manufacture of ordinary printing papers ; there is not sufficient demand to keep the machinery going, and there is, therefore, a furious struggle to get business almost irrespective of price. Machinery for producing this class has been erected at a rapid rate during the past few years, because as this was once the best division in the paper trade, it attracted the attention of capitalists who have devoted themselves to its development, until now the production has altogether outrun the consumption There appears to be no relief from this state of things except by stoppage of machinery or combined curtailment of production. Whether this will be accomplished by mutual agreement or by the examination of individual mills lies hidden amongst the secrets of the coming year. It is very fortunate for the paper maker that the materials which he uses have again been cheaper during the past year. Every reduction has been instantly given away in the price of paper, and each paper-maker has hurried into the market with the object of winning a little business by the reduction which he was able to make. This was a safe policy. However, during the closing weeks of the year, the trade has been slacker than usual, and the mills have ignored such prudent considerations as usually guide them, and have offered substantial reductions on the manufactured article without either having secured or being in sight of any reduction in the cost of making. Speaking generally, the prospects of the year which we are now entering are anything but cheerful for the ordinary printing paper-makers. The district of which Darwen forms the centre has grown in importance during the past year by the increased weight of paper it can produce, and it now exercises a powerful influence on this industry. We learn that at Spring Vale Paper Works there has been a large evaporating or incinerating house erected for which Messrs J. Orrell and Sons have had the contract, and a mill chimney for which Messrs. Lloyd and [illegible] have had the contract. The chimney is 104 yards in height, and has cost £2,000. Messrs. Coulthurst have in hand a large contract for the Darwen Paper Mill Company which has kept them well employed, and Messrs. Shorrock are doing just a fair trade.—*Paper-Maker's Monthly Journal.*

FORECAST OF THE LINSEED CROP OF THE HYDERABAD ASSIGNED DISTRICTS FOR THE SEASON 1884-85.

DISTRICTS.	Percentage by which area under linseed exceeds (+) or falls short of (–) that of previous year.	EXPLANATION.	Estimated outturn in annas per rupee.	REASONS FOR ESTIMATES.
Amraoti ...	+103·2	Cotton and *jowari* crops having been damaged by excessive rain were rooted up and linseed substituted, it being a more profitable crop.	13 annas.	Unusually favourable rain for the crop.
Akola ...	+211 8	Owing to excessive rain much of *kharif* crops had to be removed; the land thus available was sown with linseed. High price also is one of the reasons for the increase.	11 „	The crop is very flourishing, except in Akot and Khamgaon Taluks, where it received slight injury owing to rainfall in December.
Ellichpore ...	+202·6	High price of linseed in the market also partial failure of cotton.	10 „	Seasonableness of rainfall, except the late rains which will cause some injury.
Buldana ...	+ 76·9	Rotation of crops. Cultivation of linseed in the waste lands newly broken up. High price of linseed.	10 „	Recent rainfall will probably reduce the outturn of the crop to 10 annas.
Wun ...	+14 8	Owing to excessive rainfall, land prepared for *kharif* was sown with linseed for which there is great demand.	11 „	Owing to excessive and irregular rainfall, less than an average crop is anticipated.
Basim ...	+160·3	Unseasonable rain for *kharif* crop induced the cultivators to sow linseed where *kharif* crop was sown last year. Greater demand for exportation, also high price in the market.	9 „	Decrease in outturn is anticipated from the unseasonable rainfall in December last.

OUT-DOOR FRUIT FOR THE MILLION.*

We have received through the kindness of Colonel Wace, Commissioner of Agriculture in the Punjab, a copy of this little pamphlet, which we have already referred to in a previous number of the *Indian Forester*. The author, whose name is not given, but who styles himself "Head Gardener," has experimented on fruit culture in his own property near Bala, in Wales, for the last 20 years, having originally planted a choice and varied assortment of fruit trees, which in three years' time commenced bearing, and since then has borne annually increasing crops in the most surprising and prolific manner. As an example of this, in 1875, "Head Gardener" himself hand-picked three trees with the following results:—The first, a dessert pear of excellent flavour, nailed to a wall 7 feet high, yielded 704 marketable pears. The second, also a pear, yielded 748, and as the fruit was of the preserving order, very large and solid, the crop filled four huge baskets, each one a load sufficient for an average man to lift and carry. From the third tree, an espalier apple, of very moderate size, 700 choice russets were gathered, leaving behind some seven or eight dozen below a regular marketable standard. Thus, from three young and comparatively small trees, no less than 2,152 count of good, sound keeping fruit was gathered, and as there were some 25 distinct varieties of pear trees in the garden—all fairly well loaded, according to their respective sizes, and weight of fruit—for instance, one of them, of no great size, whose fruit had easily been forced up to a pound in weight, yielded upwards of 400—the general crop may in some degree be imagined."

The fruit grown consisted of choice varieties of Apples and Pears, Peaches, Apricots, Plums, fruits of the Magnum Bonum going up to a quarter pound in weight. Strawberries, Currants and Gooseberries. Black and White Grapes, and other tender fruit were grown under glass with similar success.

Head Gardener states that whatever blight destroyed or partially destroyed the fruit prospects of the neighbourhood and country at large, never once affected his trees, which his system rendered independent of local conditions.

The scientific explanation Head Gardener gives of his success cannot however be entirely accepted by us, and we should recommend him to study Sach's Vegetable Physiology, though we fully believe in the practical results which will follow a course of treatment similar to his own in the culture of Mangoes, Oranges, Strawberries and Vines, and the other fruit trees and plants which thrive in India. We have indeed experimented with an Orange tree in Dehra Dun, and obtained 10 dozen very sweet oranges from it this year, whilst in former years the fruit invariably fell to the ground without ripening.

Head Gardener states that a fruit tree has three sets of roots—

"Firstly, a mass of fibres, that cluster around its stem, and are solely for fruit-bearing purposes.

"Secondly, a lot of lateral roots, which travel long distances in search of food for wood formation, and out-balance the fruit fibres which remain closely packed at home, the consequence being, if their growth be unchecked, *much wood and little fruit.* Hence arises the necessity for closely pruning the *wood roots*, an operation which restores at once supremacy to the *fruit fibres*, when much fruit and little wood become the order of the day.

"Thirdly, the tap root, striking downwards to give stability to the tree against winds and storms. Some gardeners, however, consider it a feeder, and prune it when practicable, and to render it so, plant young trees upon slabs of stone, slate or other hard material, which prevent, of course, the tap root from striking downwards." Head Gardener, however, after protracted experiments, has decided that pruning the tap root of fruit trees neither checks the undue growth in a tree's wood, or increases its fruit supply, and that from its large size, toughness, and tendency to grow perpendicularly downwards, deep into clay, gravel, and other crude subsoil, where only poor nourishment can be obtained, that its principal or perhaps sole object is to strengthen trees against winds, and that it is a great mistake to prune or meddle with it.

As regards interference with the tap root, we are inclined to agree with Head Gardener, but besides the utility of the tap root as an anchor against storms, it is evident that in the drier parts of India, the great length of the tap root in the jand (*Prosopis spicigera*) and the sal, frequently exceeding 60 feet, solely enables the tree to obtain a supply of water during the dry season, unless artificially irrigated.

Of course in orchards where a supply of water is generally available, this use of the tap root is not of such vital importance as in the case of forest grown trees in the Panjab Rakhs, where the water bearing strata, during the dry season, is at a very great depth below the surface of the ground.

The mass of fibres, which Head Gardener calls fruit fibres, are of course merely rootlets bearing ordinary root fibres, and it is evidently a great object to obtain a large mass of such fibres near the stem of the tree, so that manure and water may be readily and economically supplied to them, as root fibres are the sole absorbers of nutriment from the soil.

The lateral roots, of which Head Gardener complains, also have root fibres near their extremities, and on their own rootlets, and are really sent out by the plant in search of nourishment, and wander further the poorer and drier the soil may be, but these lateral roots *have no real power of nourishing the woody growth of the tree, at the expense of its fruit. They, as well as the woody* tap roots, consist of conducting tissue, through which nutriment absorbed by the root fibres or feeders is conveyed to the stem, and thence through the branches and twigs to the leaves and buds.

The fact is that, every tree in a natural state tends to form as large a crown as possible before fruiting, and that premature injury of every kind to its organs of nutrition, such as a season of drought, root or leaf pruning, generally hastens the formation of fruit bud instead of foliage buds. As soon as fruit buds have been formed, a supply of strong manure should be afforded to mature the fruit.

By a liberal supply of rich manure to the rootlets near the stem, these increase greatly in number and become densely covered with root fibres, so that the plant is enabled to take up quantities of nourishment in the simplest manner.

Fruit culture is thus seen to be an extremely artificial method of favoring the crop of fruit at the expense of the crown of the tree, which is only allowed to develope sufficiently to hold the greatest possible mass of fruit the tree can be made to yield annually. Having pointed out Head Gardener's misconception of the relation of the lateral roots and root fibres, we will now follow him, as regards the practical methods for securing a large and constant annual fruit supply. He root-pruned his trees every second year or so, in following manner :—A young non-bearing tree, which was throwing out wood strongly, was pruned by a sharp spade thrust deeply into the ground a clear foot or so from the stem. In a few years' time the lateral roots again become troublesome, when a narrow trench should be dug around the tree, 18 inches or so from the stem, and the lateral roots bared and severed, the greatest care being taken not to injure the rootlets and root fibres near the stem.

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* Outdoor Fruit for the Million; how to grow it in large and continuous quantity by simple and inexpensive means. Fifth and authorised edition, revised and illustrated by Head Gardener. London: F. Pitman, 20, Paternoster-row, and Nichols & Co., 29, Oxford-street, 1883, Price, 6d.

The appreciation of the distance at which lateral roots should be pruned, is the only little difficulty about root pruning, but distances of 3, 4, 5, and 6 feet would take in standards and trees of considerable size, the best plan probably being, though Head Gardener does not say so, to prune off lateral roots at a distance from the stem equal to the spread of the crown of the fruit tree after it has been properly pruned.

The main object of root pruning is to weaken the vegetative vigour of the tree, and it should be remembered, that mere branch pruning will not do this as we see in the case of pollards, the crowns of which are replaced rapidly by strong vigorous shoots, so that after we have thinned out the crown so as to admit light and heat to the fruit, we must reduce the area of the roots, or we shall only have been treating our fruit tree as if we wished it to become a pollard.

The best time for root pruning is said by Head Gardener to be November and December, but Indian gardeners should remember that Oranges are frequently not perfectly ripe till January, and that Loquats blossom at the end of the monsoons, whilst the fruit does not ripen till April and May, so that the time of operating should be intermediate between the fruit harvest and the blossoming and will be at different periods of the year for different fruit trees.

The method of manuring is thus given by Head Gardener, and should be followed exactly :—

"I loosen carefully and draw down the few inches of top soil that cover the fruit fibre space. Then dress liberally with good solid manure, not old weather-beaten stuff with but little nourishment in it.

"2. Put the *top soil* previously drawn down, mix with a spadeful or so of fresh, or moderately fresh, lime, on the manure. The tree will then be well nourished for the winter months and prepared for spring blooming."

As regards blights, Head Gardener recommends quick-lime wash applied with a brush to the stems and large branches of fruit trees every third year or so, but he very rightly points out that many supposed causes of blight are due to the exhaustion of the tree in throwing out masses of bloom, when a proper supply of food, in the form of manure, has not been given, so that starvation, and not blight or frost, is as a rule the cause of the failure.

As soon therefore as Head Gardener's trees showed for bloom, pails of diluted liquid manure were given occasionally, as long as the blooming process lasted, and after the fruit had set, the trees were supplied once a week with this liquid, this extra feeding enlarging the fruit, improving its flavour, and enabling the trees to crop heavily without exhaustion.

The manures used were :—

1st. Drainings of the stable and cow-house, which should have pucka floors properly drained into a reservoir, so that none of this valuable manure may be lost.

2nd. Fresh solid manure of any kind well mixed with water.

3rd. Guano; a few handfuls of this, well stirred up, in a pailful of water, is highly nutritious and easily managed. As regards the labour of manuring, it was found that one man could attend to all Head Gardener's trees in about two hours.

In India, if solid bath room refuse be placed in trenches, and liquid refuse in large *gharas*, for 6 months, with the addition of a few handfuls of lime, it may be readily used for fruit culture, and without any unpleasant odour arising. The sweeper will of course supply the manure after the *mali* has trenched the plants with a small fork so as to avoid injuring the feeding roots.

Head Gardener states that—"under this culture, the trees soon covered themselves with fruit spurs and buds, which in spring threw out masses of bloom, and which, later on in the summer and autumn, yielded masses of fruit; and also, so vigorous did the trees becom[illegible] that they often bloomed a second, and even a third time, and fruit has ripened in favourable years from the second blooming.

"All fresh shoots, as the season advanced, were rigorously nipped off, leaving only a sufficiency to fill up gaps or for the gradual extension of the tree, and all leaves covering the fruit were unfailingly removed."

Regarding *strawberries, which grow very fairly in* all Indian districts at the foot of the Himalayas, the following remarks are very useful :—

"The strawberry plant is one that goes greatly to root and leaf in the soft friable soil of the garden, and bears but poorly in consequence. This plant cannot, like a tree, be root-pruned, and a most successful method of treating it was the following, *viz.* :—In a dry time, tramp the plot of ground intended for the strawberry bed as hard, if possible, as a beaten road.

"For (1) soil so hardened checks excess in root growth.

"(2). It retains moisture much longer than loose soil does, an important consideration this for the strawberry plant, whose great natural want is water in abundance.

"(3). Weeds grow both small and slowly in hard ground, and erefore can be more easily kept well under. Next, line out e well-tramped ground in rows 2 feet apart, and in these dig t moderate sized holes also 2 feet apart from each other. Then f-fill these holes with good manure, and next put into each of them three young strawberry plants (as far apart from other as the limited space will permit) to form a clump. This finish planting with the soil previously dug out, mixed with lime. The only ground required to be occasionally stirred (a long-handled spud being the best tool for the purpose) is that within two or three inches immediately round each clump, as by so doing roots gain air, and liquid manure is better absorbed. Then, before winter sets in, say, early in November, put pats of manure over the said clumps, leaving the hard ground round them perfectly bare. This protects the plants from frost, concentrates food where needed, and stops much indiscriminate waste of manure. Then in spring give the plants some good liquid now and then (say once a week) until the fruit sets. The result will be fruit rich in colour, fine in flavour, and great in abundance. By this method of cultivation, strawberry plants throw out large numbers of unusually fine runners, which must be nipped off as soon as they appear, to prevent the plants from exhausting themselves, except, of course, those required for purposes of propagation."

Head Gardener gives several instances in which, by his treatment, old and non-bearing orchards were made to yield as well as his own, and lest cavillers might say that his trees were located in some warm, well-sheltered good climatic spot, he tells us that his land is in the very heart of the Bala mountains, where the weather is the reverse of picked, so much so that people thought it too precarious for the growth of fruit

A remark of Head Gardener's regarding blight must be recorded, it is that "perfectly healthy vegetation grows too fast and exhales strong natural essences which render it an unfitting abode for a pest that only thrives by stagnation and decay; and that blight only fastens on a plant which has been weakened by being deprived of some great natural want or other." We should say that blight is induced by the decomposition of the sap due to the excessive formation of certain chemical ferments in the languishing plant. The theory of the exhalation of strong natural essences cannot be supported for a moment.

Head Gardener gives a useful plan for growing potatoes by placing the sets in rows upon the surface of the ground, and after scattering a little lime over them, covering them first with manure, and then earthening them over with soil. They are dressed with liquid manure after a few weeks, and Head Gardener maintains that by this method, the tubers are properly nourished and protected from excessive moisture of the soil, which is the usual cause of potatoe disease.

Head Gardener denies, but in this facts and science do not agree with him, that too much manure can be possibly given, as instead of gorging themselves with over-abundant food, as some animals do, plants only take what is actually required for their immediate wants. In order to avoid waste of manure, he advocates that the household slops should be poured on to the manure heap, and that half a forkful of solid manure mixed up with water in a pail and well stirred should be used.

Regarding branch pruning, Head Gardener says :—

"The following system of branch pruning has been found by Head Gardener to be very easy to do, and very effective when done :

"1. Clear away all dead or diseased wood about the tree.

"2. Prune or saw off all large and superabundant branch-wood, as each branch ought to have full play for itself without being rubbed against, and so damaged by another.

"3. So prune that branches balance well with each other—for then a tree grows gracefully, blooms uniformly, bears better, and is always an object pleasant to the sight.

"4 Prune a standard so that it be, as nearly as possible, hollow in its centre. Sun and air can then penetrate its foliage, and thoroughly ripen its fruit. Besides, the centre wood very seldom bears, and is, therefore, waste.

"5. Prune away all last year's *superabundant* new shoots—not level with their branch-wood—but so that one or two eyes or buds be left on them, because these eyes or buds will by-and-bye throw out fruit spurs, which, of course, will greatly increase the crop. Now wood shoots left for the gradual extension of the tree prune or stop down to eight or ten eyes.

"Now the stopping or pruning down forces branches to throw out additional fruit spurs, so that in time a tree becomes literally covered with them. Fruit then follows in great abundance. Prune espaliers and all kinds of fruit trees so that their branch-wood, after the operation, appears to the eye rather thin than not, as over-much wood means always but very little fruit."

As we have said before, Head Gardener's theory about fruit fibres is quite fanciful, and the diagrams with which the pamphlet closes are misleading, but we owe him our best thanks for publishing the little handbook which gives the results of his experience, and the practical advice in which can be followed with the best results.

We may note here that Mr. Ollenbach, of Dehra Dun, has grown oranges and grapes according to the same system for several years, and that there were 600 oranges last year on quite a small tree in his garden.—*Indian Forester.*

CULTIVATION OF THE KOLA NUT.

To Sierra Leone, so far as we are aware, belongs the credit of having started the first organised scheme for the cultivation of the kola nut on a commercial scale. Plants have been sent to Ceylon and Southern India by Mr. T. Christy, and introduced into the public gardens in India and Ceylon, and here and there private growers are making experiments with them, but we feel sure that we shall be within the mark if we say that it would be impossible to find so much as an acre regularly planted up with this product in either of the countries named. There are, of course, obvious and sufficient reasons for this, and also for the fact that Sierra Leone should lead the van, because the tree is indigenous to the forests of that colony, and there is already a trade [illegible] there. We are not surprised, therefore, to learn from [illegible] the local papers that an effort is being made to form a Joint Stock Company, under the title of the "Kola Nut Planting and

Registered No. 182.]

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Crop and Weather Report.

[FOR THE WEEK ENDING THE 25TH FEBRUARY, 1885.]

General Remarks.—Rain has fallen during the week in parts of Bengal and in Assam, in two districts of the Madras Presidency, in Coorg, in two places in the Punjab, in Nagpore, in the Central Provinces, and in Tavoy in British Burmah. Except in Bengal and Coorg, the fall generally has been too slight to affect agricultural operations.

There is no change in the agricultural sit[illegible]ion in Madras, but in Mysore unfavourable reports are being rece[illegible]d from the districts of crops withering from want of rain. In [illegible]org the recent rain, if followed soon by more showers, will [illegible]ourable for coffee. Rice threshing is completed. In Bomb[illegible] *rabi* is being cut in most districts, and the harvest promises [illegible]erally good. In the Berars, Hyderabad, Central India Sta[illegible] ajpootana the *rabi* promises well. In Manpore (Bhopawr [illegible] age has been caused to poppy, linseed, and gram crops [illegible]s. In the Punjab agricultural prospects continue gene[illegible]isfactory, and this is true also of the North-Western [illegible] d Oudh, though in some districts the crops have bee[illegible]y blight and insects. The *rabi* harvest has com[illegible]entral Provinces, and prospects are favourable.

In Bengal p[illegible] unchanged. The late rain has been beneficial for pl[illegible]tions, but has impeded the threshing of paddy which w[illegible]in several districts. Ploughing for *ahu dhan* is [illegible] in Assam, where also the gathering of musta[illegible]

Cholera [illegible] districts in Madras, but is abating. Small-pox present in [illegible]y, the Central Provinces, North-Western Provinces and Oudh, and Bengal.

Prices are generally steady, except in three districts in the Punjab.

Madras.—General prospects fair, except in parts of Bellary and Anantapore.

Bombay.—*Rabi* harvest commenced in parts of Surat, Ahmedabad, and Kaladgi: in progress in other districts; scarcity of fodder and drinking water continues in several talukas of the Southern Mahratta Country districts; cholera in parts of 8 districts, cattle-disease in parts of 6, small-pox in parts of 10, and fever in parts of 15 districts.

Bengal.—More or less rain fell in some of the districts of the Province. It has generally benefitted standing crops, and facilitated the ploughing of lands for the early crops. Harvesting of *rabi* crops is going on. The late rain has impeded the threshing of paddy which has commenced in several districts; prices of food-grains on the whole stationary; cholera and small-pox are still reported, otherwise general health good.

N.-W. P. & Oudh.—No rain during the week; weather generally seasonable, in some places cloudy and warm; crops damaged by blight and insects in some districts, otherwise prospects good; prices steady on the whole, and markets well supplied; general health good; a few cases of small-pox reported in Cawnpore and Kumaon; cattle-disease continues in Kumaon.

Punjab.—Health and crop prospects good; prices rising in Hissar, falling in Delhi and Peshawur, and stationary in other districts of the province.

Central Provinces.—Weather clear and cool; prospects generally favourable; *rabi* crops being harvested; small-pox in places; cholera reported from Nimar and Sumbulpore; prices steady in Nagpore.

British Burmah.—Cholera more or less prevalent in parts of Akyab, Prome, Thongwa, and Hensada districts, but not severe; small-pox prevalent in towns of Hensada and Thayetmayo and in three town-ships of Mergui district; slight cattle-disease in Hanthawaddy and Bassein, otherwise public health and health of cattle good.

Assam.—Mornings and nights cool; mustard being gathered; ploughing operations for *aus* in progress; but rain wanted to facilitate them; public health fair. State and prospects of crops as last week.

Mysore and Coorg.—Increasing unfavourable reports received from the districts, of crops withering for want of rain; cattle generally falling off in condition; water-supply diminishing; public health fair; prices show little change.

Berar & Hyderabad.—Weather clear; cotton-picking almost completed; *rabi* crops in good condition; wheat 22 and *jowari* 26 seers per rupee; threshing of *kharif* completed; harvesting of *rabi* commenced; general health fair.

Central India States.—Weather clear; prospects of *rabi* favourable; prices steady; health good.

Rajpootana.—Weather seasonable; crop prospects favourable; prices stationary; health good.

Editorial Notes.

WE see that the Conservator of Forests has invited tenders for the purchase of the right in the Thanna district to collect mowra flowers growing in all Government forests, whether protected or reserved, in alienated villages, in Government waste lands and village sites, and in the occupied lands of villages in the Dahan, and Mohun Wada, and Sholapore talookas coming under the Dahan and Kolwan settlements. In cases where there is a dispute as to the right of Government to mowra flowers, the decision of the Collector is binding. The contract is to run from the 6th of March to the end of the current year. The notification does not say how far the rights of the tribes, who have collected mowra flowers from time immemorial, will be respected under the arrangements proposed These tribes earn a precarious livelihood by the produce of the forests, and if their rights are interfered with, the consequences may be lamentable not only to themselves but also to the employés of the contractor. It would therefore be desirable that matters be smoothed in the beginning to prevent a conflict between public and private right.

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WHILE on this subject we may as well mention here that at a meeting held the other day in the Bombay Presidency, Dr. Fairbank spoke about an important little scheme which he hoped would tend in a great measure to ameliorate the condition of the Ahmednugger peasantry as also of the so-called criminal classes, the Shudras and Ati-Shudras. As is well known every district of India possesses certain communities—Mahurs, Mangs, Bhils, Gonds, and others, who apparently have no ostensible means of livelihood. In days gone by when the Forest and Abkari laws were unknown to the people, and when the revenue system together with its working had no scientific basis underlying its principles, these outcasts of humanity barely managed to eke out a miserable existence. Now it is impossible for them to do so when *kunbis* are unable to earn a living by the sweat of their brow. The latter, in a *state of impoverishment, give up tilling land, and the former* driven to desperation, have taken to lifting cattle, or destroying them by poison for the sake of the hides. Dr. Fairbank therefore proposed that, as has already been done in several instances, through his instrumentality, some of the Bombay capitalists might invest their money in Ahmednugger land, either buying out the owners or advancing loans at a reasonable rate of interest. The gentlemen present were favourably impressed by the idea, and although in the beginning there would be difficulties in the way of practical success, yet eventually it would prove a fair speculation. In honor of Mr. and Mrs. Birdwood who were present on the occasion, it was resolved to name the first farm opened in Ahmednugger the Birdwood Farm.

Notwithstanding the efforts that are being made to promote among the rulers an intimate knowledge of the arts and manufactures current among the people of India, we are yet a long way behind the needs and requirements of the times. The collection of exhibits sent to the Calcutta Exhibition, by the Government of the North-Western Provinces, has brought to notice several handicrafts which had hitherto escaped observation, and has otherwise enlarged the previously existing knowlege of others with which we are unacquainted. The following *resumé* of the art industry of the Bulandshahr District, by Mr. F. S. Growse, C.I.E., will be found highly interesting :— In the Bulandshahr district there are a large number of skilful wood carvers, chiefly in the towns of Sikanderabad, Bulandshahr and Shikarpore, though others almost as good may often be found in quite small villages. The art is mostly employed upon doors, door-panes, and shop-fronts. One pair of doors (made for the Bulandshahr Town Hall) won a prize in Calcutta ; another pair is in the South Kensington Museum, and a third has been made for the Indian Institute at Oxford. The difficulty in the way of creating an export trade lies in the insufficient supply of properly-seasoned *shisham* wood. A good workman gets from Rs. 10 to Rs. 15 a month. The cotton-prints of Jahangirabad are of good and varied design. They have won prizes at Jeypore and Calcutta. By natives they are chiefly used as counterpanes (*palang-poshes*), but they will also do for table-covers, and, as now adopted, make very effective curtains. The cost of a pair of curtains, each 11 feet 6 inches by 6 feet, and lined with similar materials of a plainer stamp, is Rs. 12. The manufacture is confined to one family, which, however, is a numerous one. They are now executing a large order for Messrs. Holme & Co., of Farringdon-road, London. The muslins of Sikandarabad are a local manufacture of long standing. The quality is fine, and the *pagris* and *dopattas* are highly esteemed by the rich native gentry ; but the prices are too high for any large general sale. About 12 families are employed in the trade. Jewur has long been noted for its cotton rugs, a blue design on a white ground, and for its *darries*, which are more like what is generally called a *khes*. Woollen rugs are now also made; of good design, medium fineness, and reasonable price, a rug, 6½ feet by 4 feet, costing Rs. 16. The price of a cotton rug about the same size is Rs. 8 ; a *darri*, 5 feet 9 inches by 3½ feet, Rs. 3-8-0 or Rs. 4, according to the pattern. About 10 men are employed. The only maker of the Khurja pottery is a man by name Abdul Majid, who is now also teaching his brother. His special colours are peacock blue and cinnamon. Large jars of these colours combined, two feet high, are very handsome, and cost only Rs. 3 each. Messrs. Holme and Co.'s agent was willing to take all the man could supply ; but I could not spare him any, having more orders than could be executed for people here in India. The maker can turn out about Rs. 50 worth in a month, and whatever he makes is sold at once. He takes an artistic pleasure in his work, for each successive batch is an improvement on its predecessor ; but he is apparently quite indifferent to developing a large business.

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The following paragraphs are taken from a note by Major D. Pitcher on the artistic handicrafts of the united Provinces :— Heretofore the Rampore State had been chiefly known so far as art products are concerned, as the seat of a manufacture of blue [illegible]ed pottery ; but the enquiries for the Exhibition revealed that his Highness is a liberal patron of art, maintaining in regular pay silversmiths, workers in electro-plate, armourers, and Cashmiri artists in painting and illumination. Embroidery also on cotton damask, locally called *khes*, and weaving of *khes*, flourish greatly under his Highness's patronage, and apparently a considerable trade exists. The excellence of the arms fashioned here is very remarkable, as is also that of some minor steel manufactures, such as wires for musical instruments, and fish-hooks, the latter equal to those of English manufacture. The pottery manufacture shows decided signs of improvement, and instead of being confined to simple blue and white, as reported last year, other colours are now attempted with success. His Highness the Maharaja of Benares is likewise a patron of art, maintains in his employ artists highly skilled in ivory rving, enamelling on gold, photography, &c., besides patronising in his estates settlements of weavers of Persian carpets. The carpets generally known as Mirzapore carpets are, it is believed, mostly woven on the Maharaja's estates. In addition to the engraved brass-ware so well known, a great deal of not less artistic, but not perhaps so well known, repoussé work in brass is carried on at Benares. Silk fabrics and *kinkhabs* were mentioned last year. The exhibits of these shown at Calcutta, both in the provincial court and in the jewel-room, evidenced that the trade is in a flourishing condition. Gold and silver lace may be added to this category, as amongst Benares specialities.

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Musical instruments are made in many towns, Rampore, Lucknow, Benares, &c., but Benares appears to be the chief seat of the industry, which admits of much ingenuity and of artistic taste. In a *sitar* from Lucknow, for instance, the body of the instrument was formed from an ostrich egg. Though confined to but one or two artists, mention may be made of the beautiful paintings on ivory procurable at Benares ; in calico printing, and painted and lacquered wood from the Futtehpore district. The exhibits came as a novelty to most who saw them. The calico printing is best seen in the ceiling cloths, which seem to be quite a speciality, as also in *jajims*, or floor-cloths, of a bold pattern and very effective. In lacquered and painted wood, the most attractive productions are the packs of cards, each 96 in number, and each differently painted, minutely and delicately.

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Pottery manufacture has made great strides at Lucknow of late years, and a very large variety was shown at Calcutta of glazed and unglazed, painted and plain, coloured ware. It is the same class of men who produce the terra-cotta groups of figures illustrating trades and handicrafts, and single figures representing types which fairly rivalled, and, in the opinion of many, exceeded, in artistic excellence a collection of terra-cotta figures of similar size which were exhibited from France. The manufacture of glazed tiles seems to be increasing and improving, some very good specimens being sent from Lucknow, and also from Futtehgurh and Bulandshahr. The engraved, repoussé, and pierced brass and copper work of Lucknow has a character of its own, very different to that of Benares. At the latter city all is apparently worked for Hindoo taste, while at Lucknow the needs and tastes of a Mussulman community have also to be studied, leading to a distinct and different set of shapes and patterns. Bidri work has received accessions in the substitution of gold for silver as mounting to the black ground-work of metal, and when the gold is countersunk and not too thickly laid on, the contrast is perhaps more pleasing than in the case of silver. In some samples again the black metal forming the ground-work has by some treatment been coloured an olive green with an effect not unpleasing. This occasional substitution of olive green for black as a groundwork may also now be found in Moradabad metal work, where it is perhaps still more successful than in bidri-ware. A point brought out at Calcutta is the existence in many districts of skilful wood-carvers and of artists in cabinet work, mustering perhaps but one or two in some districts, whose talent has been developed under discriminating patronage. Instances of this were found in exhibits from Aligurh, Gorukpore, Ghazipore, &c. In particular may be mentioned a beautiful étagére, the joint production of two local artists of Ghazipore. Saharunpore again has been hitherto better known for its carving in white soft wood than for any other work ; whereas, as proved at Calcutta, carving in hard wood flourishes thére in a manner scarcely heretofore suspected.

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Dewah pottery is a glazed ware in quiet tints and patterns, and absurdly cheap. It is produced in a small town in the Bara Banki district. As in other instances well known, the potter refuses to communicate his secret even to other members of his family ; and although he might by application drive a thriving trade, he continues to give a greater attention to a patch of land, and to look on an order for his wares more as a trouble than as good fortune. Bara Banki has another small industry carried on at the town of Zaidpore, in the shape of mechanical toys, showing great ingenuity, though roughly made.

In the town of Bulrampore and Utraula, in the Gonda district, Oudh, a few men carry on a trade in painting *petaras*, or the baskets which with the native traveller so largely take the place of a travelling-trunk, and which also find a considerable place in a native household. The designs are brightly coloured, representing birds, flowers, &c. ; jars, vases, &c., are also painted at Utraula in flower patterns, with very pleasing and artistic effect. A very large trade in perfumes is carried on in many towns, the principal of which are Ghazipore, Jaunpore, Lucknow, and Kanauj. The weaving and embroidery of muslin, though on a much lower scale than when there were native courts at Lucknow and Delhi to patronise it, is still a considerable industry. In the North-Western Provinces the chief seat of the industry appears to be Sikandarabad, in the Bulandshahr district, and again at Benares ; while in Oudh it flourishes in Lucknow, and still lives at the town of Tanda, in the Fyzabad district, and at the town of Jais, in the Rae Bareli district.

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The following is a summary of the report of the crops for the past year with special reference to wheat and cotton issued by the American Department of Agriculture :—The year 1884 has been one of average fruitfulness. In freedom from adverse meteorological influences of winter and early spring, so injurious to winter crops, it may be placed among the best in its results upon grains and forage grasses. Final reports of condition of wheat since 1870 have not averaged higher except in 1877 and 1882, though it was the same in 1874, and less by only one point in 1879, when the census average was thirteen bushels per acre. The season was less favorable for corn, though the best since 1870. The average of condition in October was 93, the highest of five successive years, following a series of five years all above an average, or of the last ten-fifteen years, very nearly twenty-six bushels per acre. The temperature of the season has made a somewhat eccentric record. In April the average of temperature of the whole country was lower than usual, except in the Pacific coast region and on the Northern plateau. In May it was slightly higher on the Atlantic coast, and a trifle lower than usual in the interior basin from Lakes to Gulf. It was still below an average in June in the Middle and Southern States, and up to or above the average in New England and the Central West. The average was not attained in July on the Atlantic coast, or by three or four degrees in the West, but was slightly exceeded in the Gulf States. August made some improvement in the great corn-growing section, while remaining somewhat below an average, the cotton States coming up nearly to an average, with such absence of rainfall or irregularity in its distribution as to seriously affect the condition of corn and cotton, and all late maturing crops. September made happy amends, with a temperature somewhat extraordinary over all crop areas except those of the Pacific coast. It was over twelve degrees above the average in the Eastern Gulf States, proving anything but a boon to that region. It was three or four degrees above an average in the West, and six degrees in the Middle States. In the more northern latitudes it proved an immense advantage in ripening the corn, saving it from another year's yield below an average. The unequal distribution of rainfall was a serious disadvantage in many districts. Drought was much more serious in the Ohio Valley than in the Missouri region, and Kansas and Nebraska have gained new laurels for abundance and reliability in crop production. As has been hinted above, there was a deficiency of heat for early maturity of maize in the belt of principal production, and for the development of other summer crops, and in some districts an excess of moisture in the planting season.

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The area of the previous wheat crop was greatly reduced by winter-killing and substitution of other crops. The present breadth is therefore greater by nearly 3,000,000 acres. The area harvested is estimated at 39,475,885 acres, which exceeds that in wheat in any previous year, in this country, as well as any other in the world. The report in April showed that in Michigan, New York, and Connecticut wheat was still protected by a covering of snow. Little mention of killing by winter alternations of temperature was made by correspondents. The fine appearance of drilled grain was generally attested. The early-sown areas were superior to late sown in the Middle States. Seeding in Maryland was generally late, and only the early sown had a good growth and sufficient root development. The average date of sowing in Virginia was a few days later than usual, yet a fair growth was made in the autumn, especially in the grain districts of the Shenandoah Valley and among the best *farms* of other sections. A fair start, producing plants of medium vigor and promise, was made in the Carolinas and Georgia, and similar conditions produced average growth in Alabama and Mississippi. In Tennessee a vigorous root growth was obtained in autumn, and tillering commenced before winter set in, in the earliest and most advanced fields. The late seeding was not so successful. The soil was too dry at seeding time at many points in Texas. In some cases the late sowings had the most favorable conditions, avoiding the drought that sapped the vitality of some early growths, causing either their entire destruction or great injury. The fields first seeded in West Virginia were the most promising. The later breadths were slow in starting, from drought and insufficient soil preparation, and not well fortified against the vicissitudes of winter. There was much mention of dry weather and slow growth in Kentucky, yet the development was very satisfactory on the best wheat soils. Drought had an adverse influence in the drier soils of Ohio, retarding development, so that the plants were generally small, yet with an appearance of health. There was great diversity of appearance on different soils. The lands improved by systematic drainage were uniformly promising of good results. The autumn was dry in Michigan, and the plants small when winter set in. The Indiana reports were not generally favorable as to early sown wheat. The medium seeding more frequently gave better results. The weather was too dry for an early start. Similar conditions prevailed in Illinois. Much of the crop had made but little growth when winter set in, and winter-killing of late wheat was feared. The seeding was unusually late. In Missouri the early growth was delayed by drought, but the later conditions were more favorable, and a fair growth was reported.

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The *early sown is not always the most vigorous.* Conditions were quite favorable for vigorous growth in Kansas. Rains were ample, and the ground was prepared better than in former years. On the Pacific coast the seeding was delayed by dry weather, but an increased area and fine growth was ultimately secured by reasonable and abundant rains. In May, condition was still reported high. In the more northern of the Atlantic coast States rain in excess, with low temperature, retarded growth, so that the plant was small, though healthy. In cold and wet soils of Pennsylvania and New Jersey growth was slow, while the mellow soils showed a stand rich in promise. The reports from Maryland indicated high condition, except on cold clay soils. The crop was already heading in North Carolina, and promising ripeness for harvest by the 10th of May. Prospects were generally favorable throughout the South, especially in Texas and Tennessee. Kentucky fields were in superior condition. North of the Ohio, condition was less favorable. In Ohio, Indiana, and Michigan condition stood fifteen per cent below the standard. There had been some winter injury in Illinois, and low lands had been flooded in the spring. The May reports from the Pacific coast were very favorable. [illegible] began to be observed in Virginia, Kentucky, and Indiana, and *to some extent elsewhere. The early sown, as a rule, was most* promising, and the drilled areas were decidedly superior to those sown broadcast. In this month the harvest was completed in the northern belt of the Southern States. The condition of spring wheat in June was very high, averaging 101. Winter wheat at the same time was reported at 93. The cool, moist weather had been generally favorable to healthy growth and to tillering. In July the condition of spring wheat was returned at 100, and of winter wheat at 94.

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The average farm price of wheat is 65 cents per bushel, against 91 cents last December. The December price in thirteen years has previously been below $1 per bushel bu five times—in 1874, 1878, 1880, 1882, and 1883. The aver in Nebraska is 42 cents, 45 in Kansas, 46 in Dakota, 50

Minnesota, 55 in Iowa, 62 in Missouri, 63 in Illinois, 67 in Indiana, 74 in Michigan, and 75 in Ohio. The average home-grown wheat in New England exceeds $1. In New York it is 85 cents, in Pennsylvania 86. It is 80 cents in Virginia, and 83 in Maryland. The price of wheat is lower than it has ever been reported by this department. It is said to be lower in Great Britain than any other period of the present century. It is a result that is perfectly natural, and that has been predicted repeatedly in these reports. A series of crop failures altogether unprecedented in Europe, stimulating production all over the world, could have no other outcome. These low prices, however, will soon reduce the area and relieve over-production.

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THE area sown in winter wheat has been somewhat reduced in nearly every State reported. The prevalence of drought interfered with fall sowing of wheat upon the Atlantic coast. Lands intended for wheat could not be broken at the usual time on dry soils. The low prices had less influence in this region than in the West. In Alabama the partial destruction of last year's crop by frost was an additional cause of discouragement. Seeding was still in progress in some of the Southern States on the 1st of December, and it is probable that a portion of the deficiency has since been made up. The reduction of area amounts to about 8 per cent in the winter-wheat States, or over 2,000,000 acres.

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THE plantation price of cotton, as reported, ranges from 9 to 9½ cents per pound. It is 9 cents in Tennessee, Arkansas, and Texas, 9·1 cents in Louisiana, 9·2 cents in Georgia, 9·3 cents in the Carolinas and Virginia. The occurrence of two crops in succession, scarcely equal to the requirements of manufacture, has caused a slight increase in prices, and may produce a greater advance hereafter.

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THE following is the telegraphic synopsis of the December report:—The December report of the Department of Agriculture indicates a smaller yield than the returns of condition in October. The October average was 74, against 68 in 1883, 88 in the great harvest of 1882, and 66 in the disastrous season of 1881. The returns of condition in October and of product in December have been unusually divergent this year. The first indicated a larger crop than last year; the latter a product slightly less, or about 98 per cent. The comparative decline is in the States west of Alabama. The comparison with last year is as follows:—North Carolina, 100; South Carolina, 107; Georgia, 101; Florida, 103; Alabama, 105; Mississippi, 94; Louisiana, 98; Texas, 89; Arkansas, 99; Tennessee, 101. Applying these percentages to our figures for the crop of 1883, they indicate a product of 398,000 bales in North Carolina, 502,000 in South Carolina, 760,000 in Georgia, 60,000 in Florida, 661,000 in Alabama, 847,000 in Mississippi, 480,000 in Louisiana, 995,000 in Texas, 513,000 in Arkansas, and 314,000 in Tennessee. The remaining territory will probably give about 50,000 bales. This makes an aggregate of 5,580,000 bales. These figures are provisional, and may be slightly by future returns. It is possible that the general pointment at the outcome of the middle and top crop have made the December returns unusually conservative, but it is certain that the rate of yield will be much below the average. It is the experience of the department that returns of final product are much too low, not by a uniform percentage, for the local estimates are more depressed in a year of partial failure, than in one of good yield. The inevitable tendency of declining production is to depress the spirits and blast the judgment of the reporter. The peculiar features of the present crop history cause a wide discrepancy between condition in September and October, and comparative product reported later. In allowing this depression, in such a year as this, there is a possibility t figures may remain too low. The October returns of condi- , notwithstanding the difference in subsequent dates of g frost, have in former years pointed quite closely to the result. In the census year the October average was and the crop 5,755,359 bales.

THE average of condition in October, and the commercial movement for four crops since 1879, bear relation as follows:—

Years.	Average.	Movements. Bales.
1880	84	6,605,750
1881	66	5,456,048
1882	88	6,910,756
1883	68	5,713,200

The October average of 1884 was 74, but the failure of subsequent fruitage was very marked, making it evident that these October indications would not this year point so nearly to the ultimate product. It would still seem possible, however, that the crop may equal that of last year, though the December returns do not warrant such a conclusion, and they are given above, with such corrections only as former experience has shown to be necessary. While it is absurd to report local estimates, or census returns even, without revision and correction, it has been the practice of this Bureau to give from month to month a fair interpretation of the returns, and not an individual estimate based on them. The interested public can thus read the history of the crop development and disasters, and reach a conclusion in accord with it; and it is very certain that individual conclusions will ever be modified by personal interest, whatever the official figures. The quality of cotton is unusually good. There was little damage from rain, and a small proportion of stained fibre. Some correspondents declared that there was no cotton. Similar reports came from Georgia and Alabama, and substantially from those further west. The falling off of the top crop—the blighting of the later bolls, and their failure to mature—is almost unprecedented, according to the returns of correspondents.

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FROM a report on the railway-borne traffic of the North-Western Provinces and Oudh during the official year 1883-84, we find that agricultural products formed 73 per cent of the total exports from these provinces. It is, therefore, evident that the character of the traffic must greatly depend on the agricultural conditions of the country, a short notice of which is indispensable for an explanation of the changes in the traffic of the year under report, when compared with that of the previous years. The seasons which principally affected the transactions in different staples (except cotton and sugar) were the *rabi* and *kharif*, reaped respectively about March and October, 1883. Cotton and sugar came into the market much later than other *kharif* crops, and the crop gathered in any year continues to be exported in pretty large quantities during the first quarter of the following year. Their traffic was therefore affected partly by the crop of 1882, and partly by that of 1883. The *kharif* rains of 1883 had terminated early, and by the time the *rabi* sowings came round, the moisture left in the ground was barely sufficient for the proper germination of the seed. The prospects were gloomy except where canal irrigation was available; and had it not been for the rains of January, the total outturn of the provinces would have been unusually small. The rain which fell on the 9th and 10th of January 1883, proved very beneficial, and the heavy falls on the 25th and 26th of the same month entirely changed the prospects. The high winds which accompanied them did some damage to the crops which, sustained by canal irrigation, were in many places most forward. Rape and mustard suffered to some extent from blight generated by the cloudy weather of March, and linseed from frost; but the season was on the whole a very fair one. Representing the full crop by 100, the outturn of wheat and barley was from many districts returned at 100; and if the average of the whole province be taken, the outturn of wheat, barley, and *rabi* pulses may be indicated by 87, 87, and 81 respectively. The *kharif* was characterised by scanty rainfall which considerably damaged the rice and sugarcane crops; the outturn of millets and pulses was from most districts returned at less than three-quarters of the normal outturn; cotton and teel, which do not feel so much the effects of a comparative drought, were the only crops which approached to a fair average.

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OF the food-grains the prices of rice alone during 1883-84 show a rise over those of 1882-83, owing to the crop having been a very short one in these provinces and in Bengal. The price of wheat did not rise in the face of a very large export during the year. This was due to the excellent crop of 1883. The prices of linseed and rapeseed were higher owing to the injury they had received from frost and blight. The price of ghee was higher, due to the early cessation of the autumn rains which had reduced the supply of fodder in the tracts bordering on the Jumna, where most of the ghee is produced. The prices of cotton and sugar were affected more by the crops of 1882 which amply fed the market during the first three-quarters of the year.

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THE exports and imports both exhibit a considerable increase over those of the previous three years. Compared with the figures of the preceding year, the exports show an increase of 58 lakhs of maunds and 56 lakhs of rupees, which is mostly due to larger exports in cotton, wheat, other grains, coal, and railway materials. Imports exhibit an increase of over 17 lakhs of maunds and 122 lakhs of rupees, due chiefly to larger imports in cotton goods, iron, coal, and railway materials.

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NOTWITHSTANDING the opening of the Rajpootana-Malwa Railway which has brought Bombay into much closer connection with the western half of these provinces, Calcutta easily maintains its lead. Judging by the value, it received considerably more than half the total exports sent out from the North-Western Provinces and Oudh during the year under report, and supplied over 45 per cent of the total imports received by the united Provinces. Bombay received 9 per cent of the total exports and supplied about 12 per cent of the total imports. The traffic with the neighbouring provinces amounted to nearly 40 per cent of the total traffic during the year.

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IN the trade of Cawnpore the imports of wheat and oilseeds from places inside the provinces show a steady decline. This is probably owing to the produce of Oudh, which formerly used to find an outlet at Cawnpore, being diverted to Benares. The exports of wheat to the ports have accordingly declined in the face of the very considerable general increase from all parts of the united Provinces. That the exports of oilseeds have not shown a decrease is simply due to larger supplies from Bundelkhund by road. Cawnpore would appear to be losing its ground as a collecting centre for the produce of Oudh; but even in its present stage its total traffic amounts to nearly one-fourth of the total traffic of the united Provinces, and is almost equal to the traffic of Agra and Delhi taken together, if we exclude the quantity of coal and railway materials which Agra received from Bengal for transmission to the Rajpootana line, and which should, properly speaking, be credited to Rajpootana.

⁂

IN cotton the exports of 1884 exceeded those of 1883 by nearly 2¼ lakhs of maunds. The whole of this increase was due to the crop produced in 1883, which arrived in the market in the third quarter of the year under report.

		1883-84. Mds.	1882-83. Mds.
Exports in the first two quarters	...	2,65,319	2,58,642
Ditto last ditto	...	13,69,980	11,42,862

More than 56 per cent of the total exports were taken by Calcutta, about 30 per cent by Bombay, and a little over 8 per cent by Bengal. The Punjab and Southern India also took comparatively large quantities during the year; most of the cotton sent to Southern India was taken by Ahmedabad for consumption in its mills. The exports were almost entirely from the Meerut, Agra, and Allahabad blocks, which are the largest cotton-producing divisions of the North-Western Provinces.

⁂

THE sweetening power of sugar made from cane, as compared with that made from beet-root, is a question upon which different opinions exist. Some say that it takes 1¼ lbs. of beet sugar to produce that sweetness obtained from 1 lb. of pure cane sugar. Others, that it takes 1½ lbs. of beet to equal 1 lb. of cane. Whichever it is, the difference is an important one, and one which our West India Committee would do well to have put to a practical test—say, by inducing one of the large institutions, such as Eton, Harrow, or Rugby, where sugar is used *ad libitum*, to use cane sugar for three months and then three months of beet. If the result in the consumption supported the opinions above mentioned, to have it published in all our papers, and a copy sent to every grocer throughout the three kingdoms. If this could be done, and the difference between cane and beet sugar, here stated, be clearly demonstrated, it would do more to bring about a healthy public opinion in favour of our own cane-grown sugars, than all the deputations to Lord Granville, Lord Derby, and all the Anti-Bounty public meetings put together.

⁂

THE following is a summary of Messrs. William, James, and Henry Thomson's fortnightly circular:—Upwards of 46,000 packages of tea have been brought to market during the past fortnight, 900 of these being Ceylon tea, and 1,500 packages second-hand and reprinted parcels. A less active business in the country, and the large supplies at the moment available, have checked anything like speculative buying; but upon the whole the dealers have been encouraged to operate by the heavy deliveries, and the rapidity with which the crop is being disposed of, and there has been sufficient competition to cause prices slowly and gradually to harden for all but the commonest kinds of tea. Demand as before has been strongest for fine qualities, but latterly more attention has been paid to grades between 9d. to 1s., and to showy Pekoes and Broken Pekoes, between 1*s.* and 1*s.* 3*d.*, which now appear relatively cheap; and prices for these have improved a little. The superior quality of the later manufacture, already referred to, becomes more clearly marked as the season progresses, and supplies now coming to market afford a better selection than for some time past. The deliveries of Indian and Ceylon, during January, were 6,489,000lbs. as compared with 5,605,000lbs. last year; the total delivery for the month being 1 million lb. heavier. The question whether the current season's supplies will suffice to meet our requirements, at the rate of consumption now reached, is attracting some attention. On page 3 will be found figures showing the position, based upon the actual shipments to 31st January (56½ million lb.)—The result shows the visible supply to be 1½ million lb. less than last year; assuming, therefore, that the increase in consumption is maintained, stocks will be reduced to a lower point than usual—perhaps to less than two months' consumption—before the autumn supplies are received. It will be remembered that last season London weights were more than 2 million lb. above Calcutta; this season, however, so far, we find no appreciable difference. The *Justilia* (s) lost, carried 500,000lbs.

⁂

ON the 6th ultimo, Captain B. D. Plummer, referring to the Mysore Gold Mining Company, reported:—Mining Operations.—Last month the following work was done underground at this mine:—Taylor's shaft, sinking below the 173, was sunk 5 ft. 9 in., the lode has a greater underlie than the shaft. The part we carried was composed of hard dolerite, with strings of quartz, worth about 1 oz. of gold per ton. We are now in hand putting in timber, and, to do this properly we have to cut down some part of the lode. I shall be able to give an idea what it is like next week. The north end at the bottom of Taylor's shaft was driven 5 ft. 10 in. The lode is 4 ft. wide; all the work was somewhat impeded by defection of the underground coolies in the early [illegible] month. The south end, at the bottom of Taylor's [illegible] driven 2 ft. 3 in.; but the greater part of the month has taken up in cutting into the west side (where the lode shifted to). There is a fine lode 4 ft. wide. The lode in bottom of the mine continues to look promising, and, tho the speed appears to be slow, we are doing our utmost. I unable to suggest any improvement, except we get European miners. We commenced work below the March last, and, in addition to sinking the shaft 69 we have put in pit-work, cleaned out the old worki secured them. Though it is slow, yet when we the nature of the rock, and the men we work with, it is satisfactory. The north end lode has been driven 13 ft. 4 in. The lode there is a good wall, but I am now unable to repo provement, though I think it sufficiently import with the driving. No. 1 rise in the back of this level has been put up 14 ft. 6 in.; the lode is 4 ft. wide. No. 2 rise has been put up 30 ft. 5 in.; the lode is 1½ ft. wide. The 135 north end on each lode was driven in the month 42 ft. 10 in. There is no lode at present, but the old workings are wide, and extend from bottom to top of the level. The cross-cut south of the shafts from east to west lode in the 173 has been completed. We have started a winze, and it has been sunk 6 ft.; the lode is 12 in. wide, of good-looking quartz. I have set an end to be driven south of the cross-cut on the west lode. After it has been driven 10 or 12 fms., I intend to open on the lode, and sink a winze, if the water will permit.

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A Resolution of the British Burmah Government on the Report on Settlement Operations in the Tharrawady and Prome districts, season 1881, contains some *highly* interesting notes on the condition and prospects of the people inhabiting them. The rainfall and soil of different parts of this tract are diverse. In the south the mean annual rainfall is 98 inches about Sanywe; in the north at Prome, between the towns of Mahathaman and Shwedaung, the mean annual rainfall is 53 inches. In the south we have the rich deep soil of the delta; in the north the soil is lighter and shallower, and the country is cut up by laterite hills and ridges. In the north of the tract villages are larger, population is denser, cultivable waste is rarer, and holdings are smaller than in the south. Very little of the cultivated land is subject to inundation, but in the northern circles the rice often suffers from drought, though anything like complete failure of the rice crop has not been known within living memory, even in the drier parts of the Prome district. The distinctive characteristics of the north and south parts of the settlement tract shade off, and disappear near the Kautha stream and Paungde, which are about the middle of the tract. The average area of a cultivator's holding ranges from 4·2 acres in the south to 1·3 acres in the north. In the circles of Prome cultivators mostly earn a part of their living by plying with their carts, by cutch-boiling, by fishing, by sugar-boiling, or by silk-growing. Though their holdings are small and their soil is less fertile, yet the cultivators in the northern circles are apparently as well off as in the southern circles. Throughout the whole tract, cases of "hopeless indebtedness" are said to be few. Substantial pagodas, monasteries, rest-houses, and other works of merit,—such as Burmans usually construct out of their savings,—are "very plentiful" in the Prome district. The landless classes, who constitute about one-fifth of the population, are in a less prosperous condition than the cultivators. Where holdings are small, sub-tenants are naturally few, and are found chiefly on fields owned by widows, or minors, or other persons unable to work. Altogether 7,527 acres, or 3·5 per cent of the cultivated land, were held by tenants, who pay on the average about Rs. 3-4-0 per acre for land revenue and rent. This payment is nearly treble the present land revenue rate. The selling price of land ranges from Rs. 16 to Rs. 33 per acre, being highest in the northern tracts, where the area of waste available for rice cultivation is smallest. These rates are higher than have been found in the more fertile tracts of the delta, where the area of cultivable waste is still considerable. The density of the population ranges from 316 to 394 per square mile in the several townships; this rate is computed in the open untry, exclusive of hill and forest. The majority of the riculturists. Means of communication by road, nd river are good, and the tract sends its surplus luce southwards to Rangoon and northwards towards ndalay.

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The last revision of the settlement rates took place in 1867, the rates as then settled ranged from Rs. 1-8-0 to 8 annas During the past 16 years the cultivated area has sed from 122,413 to 166,871 acres, and the total revenue d on the cultivated land has risen from Rs. 1,46,326 to 4,542. The average incidence of the land revenue de- of 1883 was Rs. 1·43 per cultivated acre according to the measurements, and Rs. 1·15 per acre according to the ined by the cadastral survey. The revenue has rs past been collected with very little coercion of, ent to, the people. The cadastral survey showed the cultivated area to be 207,388 acres as compared with 166,871, according to the latest measurements by thugyis. The discrepancy between the survey and the thugyis' areas ranged from 44 per cent in comparatively new lands of Tharrawaddy to 20 per cent in older villages of Prome. The result of cutting the rice crops on 142 patches of land in the Tharrawaddy and Paungde townships gave an average yield of—

42 baskets per acre on	I class soils.
30 baskets per acre on	II class soils.
19 baskets per acre on	III class soils.

These rates are somewhat below the average yields ascertained in the southern townships of Tharrawaddy. No crop-cutting was done in the Shwedaung and Mahathaman township. The average prices obtained by the Prome cultivators for their paddy during the past five years have been higher than the Tharrawaddy prices by reason of demands for the Mandalay market. Owing to the greater density of population and to the scarcity of cultivable waste, wages are lower and the cost of cultivation is smaller per acre than in tracts nearer the delta. Though the cultivator has been getting higher prices for his paddy during the last few years, he has not—so the Settlement Officer reports—to pay any more for the salt, tobacco, fish, and other necessaries which he consumes.

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The Settlement Officer's proposed rates, when applied to the land, yield an increase of Rs. 53,700, or 29 per cent on the rice lands, and of Rs. 2,349, or 16 per cent on the garden lands. In some large kwins (village areas) the proposed new demand is more than double the present revenue. The incidence of the present and the proposed assessments on the new or cadastral survey areas is as follows:—

	Rs.
Old or present assessment, with cess ...	1·15 per acre of cultivated land.
New or proposed assessment, with cess...	1·35 per acre of cultivated land.

These rates are low compared with the prevailing rates in the delta districts. But it has to be remembered that the cultivator has to pay out of the profits of his farm, or out of his other earning, not only the land revenue but also the capitation tax. The latter impost, at Rs. 5 per family, falls lightly on an average holding of 36 acres in the delta districts; but it falls very differently on an average holding of 1·6 acres in Shwedaug, or 1·3 acres in Mahathaman. The owners of these small holdings cannot live wholly, perhaps many of them do not live mainly, by their land. Probably the proposed assessments could and would be paid. But the smallness of the holdings, and the consequent inability of the cultivators to live by the proceeds of their lands, must be factors in deciding whether or no large increase can properly be made in the land revenue demand.

PERUVIAN GUANO.

We had occasion the other day to refer to the Peruvian guano, and to remark on its utility as a manure. The subject has attracted some degree of attention at home, and we are glad to find that the matter has been taken up by a competent man, like Mr. Church, for many years Professor of Chemistry at the Royal Agricultural College, Cirencester. In raw Peruvian guano, as we said, although it consists chiefly of the excrement and urine of marine birds, there is a very fair mixture of the altered remains of their dead bodies, and of the bodies of other animals. There has been a chemical change in these matters, and they form a nearly uniform mixture, which loses little of its value in those parts of South America which are comparatively rainless. Now the worth of guano as a manure may be accepted as a fact, when we come to know that many preparations offered to farmers are called by that name, to which they have no right. Owing to adulteration, these things possess little or no power to increase the yield of the land, while those which are capable of improving the crop are generally defective. It is for this reason alone, that no artificial or mixed manures, yet invented, have been able to take the place of raw Peruvian guano. It will best be apparent when we consider what is needed in a manure, and what are the distinctive features of the guano, in comparison with its substitutes and imitations. In the first place, manure is used because agriculture makes much more severe demands upon the soil than nature. In agriculture, instead of restoring what is drawn from the soil, or what the plant takes in from the atmosphere, the farmer removes from the land altogether, in the crops, and cattle, and dairy produce which he sells, large quantities of the most valuable substances, such as nitrogen, phosphorus and potassium. But this is not all, nor is it the only reason why agriculture must restore by art the losses of the soil. The farmer extorts from the land more than it can yield in the natural course of events; he insists upon thirty bushels of wheat where nature would give but fifteen. There is so much extra productive power required in the land that this demand must be met by giving more food to the plant, and food of the right sort. Besides this, the farmer is more exacting, and instead of allowing wild plants and weeds to grow, he dictates to the soil what kinds of plant it must support for his profit. And he will persist in growing the same succession of plants every four or five years. Now, in order to succeed in procuring these artificial results, the agriculturist must feed his land not only in a liberal manner but with skill. Farm-yard manure is good, but cannot always be got, and when used too freely in large quantities, year after year, leaves in the ground an immense quantity of unused nourishment; it must therefore be supplemented by other manures, and this want is supplied by raw guano. Now the question which naturally suggests itself is, "Why cannot the farmer get what he wants in artificial manures and mixtures?" The three chief materials which he wants to feed his crops, are nitrogen, phosphorus, and potassium, and these may be bought most cheaply in nitrate of soda, coprolites, and kainite. Why then cannot these things be so mixed up with other materials necessary to make up their deficiencies as to become an artificial guano, for all purposes identical with that produced in Peru? We will let the Professor answer the question himself. He says:—"Surely such a mixture will *analyse as well* as guano?—so much nitrogen, so much phosphorus, so much potassium—and it will cost less. "But the weakness of this argument lies in the fact, that such artificial manures do not really present those necessary elements of plant food in the same forms as those which are found in guano. Moreover, they do not contain so large a variety of such compounds, nor are they associated with the same substances—substances of little direct use, it may be, to plants, but serving important indirect purposes. And, we may add, the mechanical or physical state of these artificial manures usually differs much from that of guano.

Our next argument in favor of guano is offered with some reserve, not because we suspect its soundness, but because it may easily be pushed too far. We have no unreasoning prejudice in favour of natural manures as against artificial, but we must give due weight to the fact that, in the perpetual circulation of matter which goes on in the world, the mineral kingdom sustains the vegetable, and the vegetable the animal. And we know, too, that animals during their life and after their death yield various matters, which, both in their chemical composition and their mechanical state, are particularly well fitted, as they gradually return to what may be called a mineral condition, to nourish plants. Briefly, the earth feeds the plant, the plant feeds the animal, the animal feeds the soil. Compared with the immense quantity of matter in the crust of the earth, this matter in circulation between the three kingdoms of nature, is a mere trifle, but then it is going its regular round, and doing its proper work, for which it is perfectly adapted in every way. Further, some of this matter in circulation, including much valuable nitrogen and phosphorus, is every moment dropping out of circulation and is lost to agriculture, being carried into the rivers, and by the rivers to the sea. And so it is a fortunate circumstance that we are able by such a manure as guano, produced mainly by sea-birds which feed on sea-fish, to reclaim from the ocean a part of the lost treasures of the land.

And now we must hasten on to say something definite about the properties and composition of guano itself. Let it be granted that we are dealing with an average quality, yielding, on analysis, fair proportions of nitrogen (expressed as ammonia), of phosphorus (expressed in the form of pure bone earth), of potash, and of so-called "organic matter." But the figures of an analysis do not suffice to explain the whole story of the efficacy of this manure. How is it that for centuries guano alone has maintained the otherwise barren sands of these South American shores in a state of admirable fertility? We attribute this result, and similar results in other countries, not merely to the richness of this manure in plant food, but also to its very complex composition and its remarkable mechanical state. The soft light powder is not so fine as to be washed away through the soil, nor so coarse as to remain without becoming commingled with the earth. Its power of taking up and holding water allows those chemical changes to take place in it, without which its full power of nourishing the crop could not be developed. It is ever giving out carbonic acid gas, which makes the bone-earth of the manure dissolve, and so brings it into the state in which it can enter the roots. And, above all, its nitrogen and phosphorus exist in several forms, some at once ready for the use of plants, some soon becoming available, and the others being brought into activity later on. Thus, an average sample of guano just analysed contained nitrogen in at least six different forms—namely, nitrates, nitrites, ammonia salts, uric acid, guanine, and a substance more complex than any of these. These several things become ready for the use of the growing crop in the order we have named, at each stage of the plant's growth something being prepared for it. This important property of raw guano may be illustrated by many familiar examples. Take one—the case of a sprouting wheat-grain. The embryo, germ, or chit, is there associated with an abundance of manurial elements—nitrogen, phosphorus, and potassium. Compounds containing these elements are crowded within and around the parts where growth begins, to an extent three times as great as that in which they exist in the other parts of the grain. But they are not all at once ready for use, nor does each occur in but one form or condition. Step by step, as the substance of the sprouting grain decays, these nutritive matters become free and suffer change, yielding a variety of compounds each serving some useful purpose. Much in the same way, the plant finds in guano materials which can be turned to account exactly when they are needed. For this reason attempts to use nitrate of soda, or sulphate of ammonia, in place of the nitrogen compounds of raw guano, do not fully succeed in actual farming practice. The influence of the manure is at once too intense and too fugitive. While it acts, it acts too strongly, and afterwards, when we want its help we find that it has all been washed away. Sulphate of ammonia, though retained in the soil longer than nitrate of soda, has the same defects. As with the nitrogen, so with the phosphorus; there are present in raw guano phosphates of ammonia, of potash, of magnesia, and of lime, which, like the above-named nitrogen compounds, come into use one after another, feeding the crop step by step as it needs help, and yet being kept about the roots till required. It should be added here that so great is the solubility of the more valuable parts of raw guano that mere rain water will at least extract 80 parts out of every 100 parts of its nitrogen, and nearly 50 out of every 100 of its phosphorus, even the undissolved residues of these two things finally becoming themselves soluble, and therefore useful, as the guano changes in the soil. This should be borne in mind in connection with the use of strong chemicals, like oil of vitriol, to make guano more soluble. This treatment not only impairs its admirable mechanical texture, but breaks up t numerous and peculiar compounds upon which the progre action of guano depends, reducing it in [illegible]measure to t common-place level of an ordinary artificial manure.

It would, however, be unreasonable to argue that there a no circumstances in which the addition of other substances to guano, or its chemical treatment, may be advisable. For fixing the ammonia of those guanos which are so rich in that ingredient, or are so constituted as to lose an appreciable amount of it, by ordinary exposure during transit or unavoidable storage, the process of "dissolving," or "sulphating," possesses unmistakable value. When, too, we have to deal with hard and intractable guanos of the phosphatic class, their conversion into a peculiarly effective form of superphosphate is clearly desirable. The treatment of guano with sulphuric acid was patented by Dr. Richardson, of Newcastle, so long ago as 1859. It has done good service, but it always involves a large addition of non-manurial matter—about 1 ton of acid to

5 tons of guano is usually empolyed. Not infrequently the addition does not stop here, for sawdust, peat, and other useless substances too often follow in the wake of the oil of vitriol. Now-a-days the introduction of sulphate of ammonia is required in order to bring up the treated guano to the guaranteed strength. When raw guanos contained nitrogen equal, not to 8 or 9 per cent of ammomia as at present, but to 13, and occasionally even much higher proportions, then some method for preventing the escape of that constituent was often needed. An instance of this was furnished by a Peruvian guano imported in 1865, which lost by mere keeping for a few months in a corked bottle 9½ per cent of ammonia, the total originally present having been nearly 21.

COORG.

In the last administration report of Coorg, we find that the extent of land under food-grains remained stationary. Seventy-three thousand and twenty-one acres have been cultivated with rice, and 1,433 acres with dry crop, or 6 acres less than in the previous year. The most important, although not now the most paying, industry in the province is that of coffee-planting. There are 218 coffee estates owned by Europeans and 44,428 by natives, covering a total area of 74,074 acres. The area of the land held by the former is 38,213 acres on an assessment of Rs. 69,398, and by the latter 35,861 acres on an assessment of Rs. 65,892. Besides these, coffee to a large extent is grown on the *bané* (uplands attached to rice fields), the extent of which is roughly calculated at 13,000 acres. The average size of each coffee plantation held by Europeans is 185 acres and by natives 8 acres. The number of persons resident on European coffee estates and large native estates is 26,893, according to the last census, taken on the 17th February 1881, but this number is augmented by about 20,000 during the picking season which closes in January. Of the whole area of land under coffee cultivation, 41,600 acres are said to be in full bearing. Owing to the heavy crop picked the outturns, estimated at 2 cwts. the acre on native, and 4 cwt. on European estates, come to about 5,109 tons, being almost the double of the previous year. Calculating the average cost of cultivation at Rs. 100 per acre on European estates and Rs. 40 on native, each cwt. of coffee cost on an average Rs. 23 to produce. The cost of cultivation, at the rates per acre assumed above, comes to nearly twenty-nine lakhs of rupees. Of this not less than 60 per cent may be estimated as having been the price of labor. The value of coffee produced, taking the selling price to be on the average Rs. 25 per cwt. on the spot, come to Rs. 25,54,000.

An agricultural farm has not yet been established in Coorg, but efforts were made during the year to improve products by the introduction of fresh seed. A fine quality of rice, which was obtained from Alur, has been cultivated by the ryots successfully, and another variety known as the jira, has been obtained from Canara, and will be tried this year.

Unfortunately most of the wheat received from Cawnpore failed to germinate; while that obtained from the adjoining Hassan in Mysore, though it gave every promise of in the Nanjarajpatna Taluk, was damaged completely two very heavy and altogether unexpected downpours of rain in the month of December, which ruined at the same time the ordinary Bengal-gram crop grown by the ryots.

The potatoes, carrots, Bellary onions, squashes, Dillseed, Japan, French and broad beans, supplied to the market gardeners, rotted away in most taluks from the same cause, and partly from want of care, but they succeeded fairly in others. Their cultivation was introduced from Hassan, where they were first raised several years ago from seed distributed by the present Commissioner of Coorg.

Tobacco seed from Dindigul and Coimbatore, of the variety from which Trichinopoly cheroots are made, succeeded in the Nanjarajpatna and Yelsavirshime taluks.

A good variety of ginger introduced from Shernad in Malabar is thriving well in most taluks. The introduction of the pepper vine from Malabar proved a failure from the cuttings having rotted in transit.

For the first time for several years past, the planters experienced great difficulty in procuring a sufficiency of labor for plantation work. The Mysore coolies were late in coming in, and, when the batches did arrive, they were less than half the number for whom advances had been made. The causes assigned were the abundance of the crops which had caused a fall in prices of food grains, and the demand for labour on the Bangalore-Tumkoor line of Railway which was under construction. Some of the estates suffered from the weeds not having been removed in time, while in other cases the managers and proprietors were saved from heavy loss only by the strenuous efforts which they made to import labour from the Tamil country near Salem, and by employing the costly but valuable labour from the Western Coast. Owing probably to questions affecting the tenure of land in Malabar, the numbers of coolies, chiefly Moplas, who were attracted from that part of the country, were unusually large; and with their aid the difficulty of securing the crop was tided over. Many of the Tamil coolies, who were imported, failed to give satisfaction, but others have done well, and their advent to the country is welcomed, the more so as many of them are willing to engage without advances. The Mopla labourers proved also most useful in doing good work on petty contract on the roads.

To compensate, as it were, for the losses in the previous years, the number of deaths among cattle was comparatively light, being 2,668 head against 14,347 in 1882-83; and this notwithstanding that the rain-fall was fully up to the average. Evidently, nearly all the weakly cattle had succumbed to the heavy monsoon of the year before.

No greater blow has been dealt for many years past to the prosperity of Coorg, and to the coffee interest, which it owes its flourishing condition, than the heavy fall in the market price, which took place at the close of the season. It has decreased from Rs. 40 to Rs. 25 the cwt. within the last two years, and in the Home market from 100 shillings to 61 shillings, or 40 per cent. The cause is attributable to the overstocked condition of the London market. The *Times* in a recent issue describes the stock as apparently inexhaustible, and states that it is not known to how low prices may still fall. Ceylon and Coorg have to compete with Brazil where there is slave labour, and where fresh land is said to be abundant. The extension of railway communications in Brazil is another advantage in favor of that country, and in recent years the planters there have been taught by settlers from Ceylon the proper manner of curing and preparing coffee, so that Brazil coffee has lately obtained in the home market as good a price as that of Coorg. The native coffee is chiefly in request for the French market, to which quantities have been exported direct from the Western Coast.

Owing to the good crops reaped in Mysore, the prices of food grains showed a tendency to fall still lower. Rice, the staple crop of Coorg, fell to Rs. 1-12-0 the maund of 80 lbs., or annas 12 less than in the previous year, and ragi to Rs. 1-2-0 or annas 5 less. The market was so dull at the end of the harvest in the Yelsavirshime taluk, that sales could not be effected for some time. The ryots acknowledged the liberality of Government in giving them time to effect a sale by the recent alteration in the payment of instalments of revenue.

The rain-fall during the year was slightly above the average:

	Inches.	Cents.
That registered in Mercara being	140	29
„ in South Coorg	80	35
„ in East Coorg	44	33
„ on the Western Ghats ...	252	79

The season opened very favorably for all agricultural operations. The timely blossom showers led to fine crops of coffee and cardamoms being picked. The subsequent rains ensured the safety of the rice crop, which was fully up to the average, but in Eastern Coorg serious damage was done by the heavy rains to the ragi and Bengal gram crops, especially by two unexpected downpours, which took place in the month of December. These showers caused also some damage to the coffee crop when drying on the barbacues, and to the rice crop in South Coorg.

Miscellaneous Items

THE latest reports from the Assam tea districts are good, and should the weather continue favourable, a somewhat earlier season than that of last year may be anticipated.

RAJA UDAI PRATAB SINGH, of Bhinga, has made a grant of Rs 100 to Pundit Sri Lal, Secretary to the Bijnour Agricultural Society, towards his expenses at the Royal Agricultural College, Cirencester, whither he proceeds in April next.

ON the suggestion of Mr. Havell, the Superintendent, the local Government have directed that wood-carving should be taught in the Madras School of Arts, and while Mr. Havell was on tour, he managed to secure the services of an experienced workman from Ramnad. The school is largely resorted to by pupils in Madras, and from the mofussil.

THE prospects of the shareholders in the M[illegible]ore Gold Mining Company still continue to improve. T[illegible] la[illegible] [illegible] rom J. D. B. Plummer, the manager says [illegible] up [illegible] g on the 19th of January, 48 tons of ore yielded [illegible] [illegible]old, and 129 tons of other quartz yielded 28 ounces, giving [illegible] of 231 ounces of gold produced from 177 tons

THE value of gold imported to this country, during the first ten months of the current financial year, was Rs. 4,50,26,335, whilst that of silver imported was Rs. 5,61,90,934. This leaves a balance of both metals in favour of imports of Rs 10,12,17,269. The assay value of coins and bullion received at the Indian mints from the 1st of April last to the end of January, was Rs. 4,56,49,031, and of those coined and examined, Rs. 4 52,74,404.

THIS staple article of ex[illegible] from Pondicherry (ground-nuts) has commenced to arrive in small quantities, but owing to the uncertainty that prevails as to the out-turn the present quotations are purely nominal, and not to be depended on; last year the rate during the shipping season, varied from Rs. 11 to Rs. 16 per French candy (560 lbs. English). The crop is lost almost entirely, within a distance of twenty to twenty-five miles from the coast.

A CORRESPONDENT writes:—"We had a shower of rain on the morning of the 1[illegible], an event that deserves to be chronicled, at Aden, but it was so light in the Settlement, that the only effect it had was to s[illegible] the ground for a cricket match at the Isthmus position. He[illegible] [illegible] ds. n vever, hung over the hills beyond Lahej, which [illegible] [illegible] in [illegible] t[illegible] [illegible]sion that will benefit [illegible] country from which [illegible] draw [illegible] and other supplies.

A WRITER in a Mauritius paper draws attention to the food-supply obtained by Mauritius [illegible] Madagascar as a fruitful cause of fever. He declares that the live-stock imported is in the worst possible condition for human food, and that other supplies prepared in Madagascar are so carelessly and filthily got ready for the Mauritius market as to be anything but a proper staple of food. He sugges[illegible] stricter examination in the case of prepared supplies, and a strict system of quarantine in the case of live-stock.

THE Chinese tea merchants at Foochow have issued a manifesto to the tea-growers up-country, warning them of the decadence of the tea trade with foreign countries, and calling their attention to the large increase of late years in the sale of India teas. The circular also insists on the necessity for more care being used in both the cultivation and preparation of the tea, if the trade is not to be entirely lost, and it points out that the prices have declined at least one-half since 1870, and that the losses to the trade have been very severe.

THE following ruling of the Board of Revenue, Madras, has been approved by the Government:—Poppy-heads cannot be excluded from the operation of the Opium Act, as section 3 defines opium so as to include poppy-heads. It appears that an intoxicating drug is made out of poppy-heads in Northern India. In this Presidency, however, they are exclusively used for medicinal purposes and the trade in them is very small. The Board recommend that the fee of Rs. 3 levied on licenses to sell poppy-heads be reduced to eight annas.

A CORRESPONDENT writes:—"Dame Nature played a strange freak in my wife's poultry yard. Your correspondent alludes to small-sized eggs with no yoke. The one laid by our English fowl was of the usual size, but on the shell being broken and the contents poured into a dish, out came not only glair and yoke, but a small egg with a perfect shell which had evidently been floating inside the large egg. This small one, which was about the size of a pigeon's egg, had no yoke. With the exception of its size, in shape and appearance, it looked like any natural egg. Can Dr. Shortt explain this freak of nature?"

THE Murree Brewery Company have advertised a new issue of scrip. to the extant of 100 shares, of Rupees 100 each, to assist in paying for the Nilgiri Brewery Company's property which they recently purchased. The purchasers of the new shares, we learn, will be entitled to half-a-year's dividend; the last seven dividends having averaged 13 3/7ths per annum. The Murree Company have always done a profitable business, which seems likely to be augmented by the extensions now being undertaken in the Madras Presidency, and we think the prudent investor may safely take the offer advertised into consideration. The Company's Rs. 100 shares are at present quoted at Rs. 140.

ANENT Silage, Mr. Jas. Howard, of Bedford, M. P., writes:—The result of my experiments may be summarised as follows:—1. That the production of silage of uniformly good quality, with a minimum of waste, is possible 2 That the cost and trouble of top-weighting, of any kind, is unnecessary. 3. That the uncompressed portion of fodder at the top of the silo is equal in quality and flavour to that in the middle, or at the bottom and sides. 4. That the silo may be filled up at different times during the season without damage to the first material put in. 5. That under ordinary conditions no attention is requisite during the process in regulating the range of temperature.

IT seems probable that the despatch of coolie emigrants from Calcutta to Mauritius will soon be put a stop to. At least such is the opinion of the St Louis *Commercial Gazette*. Already, it appears, the Mauritius Government have had to put up with the loss of Rs. 20 per head, and food, for a month, for 111 coolies lately landed, and there are time-expired coolies at present unable to procure work. Our contemporary suggests that 300 coolies who were shortly expected to arrive from Madras should at once be sent back in the same vessel that brings them, as the most economical course the Government can pursue, for, owing to the failure of the sugar trade, there is no demand for coolies on the part of the planters, and matters do not seem to be likely to improve.

THE Government of India are so hampered by the Tenancy Bill, that it is extremely unlikely anything will be done this session in the matter of factory legislation. The feeling among mill-owners in Calcutta is that legislation is not needed in their case; but Bombay not unnaturally scouts the idea of any Act being passed which is not applicable to all India, as otherwise the Western India Mills would be seriously handicapped. Perhaps another commission may be ordered to assemble to enquire into the working of the mills in Bengal and Upper India. In Calcutta the difficulty often is to get the operatives to work more than three or four days out of the seven, the high wages which they can earn in that period enabling them to "play" for the remainder of the week.

THE Madrassees have good reason to congratulate themselves on the effectual and rapid way in which the repairs to the source of their water-supply, the Red Hills tank, have been carried out; and it is now confidently announced that no further anxiety need be felt about a sufficient water-supply for the city during the coming hot weather. Already it is calculated that there are 912 millions of cubic feet of water stored in the tank, of which fully 600 millions can be made available for the drinking supply of Madras, whilst a further quantity of 200 millions of cubic feet is stored in the Ch[illegible]evaram tank, both amounts being fully equal to a year's supply for the town. The whole of the work of repairing the Red Hills tank is expected to be completed by the end of September.

Selections.

FLOWERS OUT OF SEASON.

THE untimely flowering of trees and shrubs, like the occurrence of the extraordinary gooseberry, is a subject which crops up at such regular intervals, as almost to belie the epithet applied to it. Nevertheless, the very frequency of the comment is an indication that the matter is ill understood.

The ordinary time-rate for the production of new cells, new leaves, new flowers, and so on, varies, as we see, within wide limits. Equally obviously those limitations are imposed by the conjoint effects of inheritance and of external conditions, such as climate or food, or both. An annual plant rushes through its life in hot haste as it were; save and except in the seeds of such plants there is comparatively little building up or maturing of new tissues to be done, and proportionately still less stores of potential food to be accumulated. If, on the one hand, the requirements of such plants are less than in the case of perennials, their exigencies are, on the other hand, more pressing What they take from the soil, or atmosphere, what power they derive from solar light and heat, must be got quickly, or not at all. One illustration of this is afforded by the paucity of annual species in the Arctic regions or at high altitudes. Neither heat nor light is absolutely deficient in such situations, but the length of time during which they are available is too short to allow annuals to profit by a sufficiently large aggregate [illegible] them to mature their seeds. Before they can accomplish their purpose, they are overtaken by frost, and their activity is put a stop to. The energy of perennials, it is true, may be checked in the same manner, but they have been enabled, before the evil day arrived, to lay up stores of nutriment available for use when the increasing heat and light of the following year shall once more quicken their activity. The work to be done is spread over two or more seasons instead of one, and the chances of success are thus correspondingly enhanced. But if we suppose the conditions to be uniformly and continuously favorable, the abrupt cessation of growth will no longer be manifest, the annual will cease to be an annual, the perennial will not die down in winter, the growing points of the buds will not encase themselves in scales, vegetation will be continuous. Such halcyon conditions find their nearest realisation in most equatorial climates like that of the Malay Peninsula and adjacent islands. But even there the realisation is not perfect. Something happens to disturb the balance; and even the conditions are generally uniform, there is always the idiosyncrasy of individual plants to form a disturbing factor.

such conditions, though favourable to the continuance of vegetation, are less propitious to the establishment of fructification. The formation of stem, leaf, flower, even of fruit, is one thing; the maturation of the seed and of the embryo-plant within it is another; and the conditions propitious to either are correspondingly different. The ripe seed makes in proportion larger demands on the plastic matters formed as a result of metabolism, and has almost invariably the same composition according to its species, but this cannot be said with equal truth of any other part of the plant.

Again, the conditions for growth, that is, mere increase in bulk, are different, in degree at least, from those which favour progressive development or metamorphosis. Speaking in general terms, it may be said that vegetation approaches its end where fructification shows signs of commencement. There is indeed no fixed line of demarcation to be drawn, but while morphologically there are gradations and intermediate forms, physiologically there are also transitions, and periods of instability. It is easy to understand how this happens, and how it is the divergences are not greater. These matters indeed partake so much of the nature of truisms, that some apology might almost be needed for insisting on them, were it not that they are absolutely essential for the due comprehension of the phenomena of untimely blooming.

It is also desirable to draw attention to the fact that there is naturally a wide range in the period during which vital activity manifests itself even in individuals of the same species, and as these individuals vary in colour, stature, &c., even when derived from the same stock, so others may vary in their "time-rates." This is specially noticeable in the case of the horse-chestnut, and is perhaps more often manifest in the form of precocious development in spring than in that of tardy growth in autumn. In most cases the plant has to attain a certain age before it produces flowers, but occasionally we find individuals so precocious that they are scarce out of the seed before they burst into flower. A cocoanut has thus been seen in flower while the husk of the fruit was still attached to it. Gardeners, according to their requirements, have freely availed themselves of these individual differences, by selecting for perpetuation late or early varieties. The whole subject of the "chronometry of life," it may here be mentioned, formed the text of a valuable lecture by Sir James Paget, at the Royal Institution, many years ago.

Cases of unseasonable blossoming may be ranged under three heads, according as growth and development are: (1) prolonged beyond the ordinary time; (2) premature or manifested aforetime; (3) renewed after a short interval of arrest. Categories (2) and (3) differ in detail rather than in essence, as will be explained further on.

Taking the cases of continuous or prolonged growth first, it is easy to see that many of them are due to a continuance of favourable conditions. A long spell of summer, without excessive heat or drought, will insure a longer period of blooming; flower will succeed to flower so long as the weather and the natural changes in the tissues of the plant, according to age, are held in abeyance. How small are the exigencies of some plants in these matters, may be illustrated by the fact that there are few days in the year when a daisy or a white dead nettle may not be found in bloom, at least in the southern half of England. It is necessary, however, to introduce some qualification, because one has only to look into one's garden to see that, in spite of apparently favourable conditions, many plants are not to be induced to continue blooming. Although in duration perennial, in the matter of flowering they behave as annuals. Something in their organisation forbids the prolongation of the blooming period. That this is so is at least rendered highly probable by the circumstance that the same reticence is exhibited under cultivation. As an illustration of an opposite character, may be mentioned the prolongation of the blooming period even under relatively adverse circumstances, which has been brought about by the art and selection exercised by the gardener. Take roses, for instance, only one of many that might be cited. Our fathers had to be content with what we now call summer roses, roses of great beauty and exquisite fragrance, but which they must have wept to see "haste away so soon." Now-a-days, the case is very different, there is a whole legion of so-called "hybrid perpetuals" marked in the catalogues of the nurserymen as H. P. By their agency a second crop of roses is assured, while some will continue in favourable seasons to expand their blooms in succession up to Christmas. This prolongation of the flowering season has been brought about by combining, by means of hybridisation, the robust qualities of European [illegible] with the continuous blooming tendencies of the Indian rose. [illegible] varieties of pear, the common laburnum, the Wistaria, Weigela, the hybrid *Berberis stenophylla*, some rhododendrons, currants (*Ribes*) exhibit this phenomenon, the flowers being produced on the ends of more or less prolonged shoots, as strawberries, under like circumstances, produce their flowers on the ends of the "runners" of the year.

The premature development of flowers in autumn has a better title to be called unseasonable, because the phenomenon is really due to the unfolding of flowers which, under ordinary circumstances, would remain passive till the following spring. There is not, as in the former case, a new formation or a continuous growth, but merely what the French appropriately call *fleuraison anticipée*. And here for a moment it may be allowable to call attention to an essay of Linnæus, entitled *Prolepsis Plantarum*, little read now-a-days, although based on facts, and containing much that is still worthy of consideration. For him a flower was a shoot with lateral outgrowths, a morphological conception that would still satisfy a German transcendentalist. But, further, this shoot and outgrowths were supposed to represent the outcome of six ordinary years' work contracted into one. A flower was, according to this theory, a shoot in which the differentiation [illegible] parts instead of being spread over six years was hurried on and completed within one season. For Linnæus, leaves represented the work of one year, bracts that of the following one, sepals of the third, petals of the fourth, stamens of the fifth, and the pistil, that of the sixth year. It is not necessary to discuss the morphological aspects of this theory, but it is revelant to our present purpose because it emphasises the relation of leaf-shoot to flower—a relation enunciated about the same time, and independently one of the other, by Wolf and by Linnæus, and thirty years before Goethe, propounded a similar notion. Moreover, it brings into prominence not only the morphological relation of shoot and flower, but one manner in which the time of production of the shoot and of the flower respectively may be varied, a subject having an immediate bearing on the question of unseasonable flowering. If, says Linnæus (*prolepsis*, § iii.), "a shrub which has been grown in a pot, and has borne flower and fruit every year, be transferred to richer soil in a hot-house, it will produce for many years numerous leafy shoots, but no fruit. From which it may be inferred that the leaves are produced from the same source whence the flowers previously sprang, and so in turn what now tends to form leaves would, by this agency of Nature, be converted into flower, if the same tree were again placed in a pot so as to confine the roots; hence gardeners desirous of obtaining a more plentiful crop of strawberries, cut the fine roots of the plants in spring before they transplant them, in the hope that they will produce more abundant flowers and fruit." Here we see the same principle laid down as that upon which gardeners act when they wish to secure flower and fruit by cutting off the supplies, and thus making the plant, to a greater degree, dependent on the elaborated reserve stored up in their tissues. This is effected by growing plants in small pots, root-pruning, transplanting, ringing, and other processes, all of which tend to diminish root-absorption, and by disturbing the balance between it and other processes, to check vegetation, and in so far to promote the formation of flower. Charles Martin relates the production on a very large scale of inflorescence on the agave, in Algeria, as the direct consequence of the excision of the leaf-buds by a troop of French cavalry, who hacked the plants with their sabres as they passed, and thus, by preventing or checking growth in one direction, stimulated it in another. In like manner I have seen flowers produced on the "suckers" of *Ailanthus glandulosa* when the plant was quite young, on the roots of *Pyrus japonica*, and on a sucker of agave, as the result of injury, probably in all, certainly in some, of the instances

The frequent production of flowers out of season on newly transplanted trees is accounted for in like manner. But many trees are flowering this autumn which have not been slashed with sabres nor moved by more peaceful weapons. One such tree, a horse-chestnut, I lately (September) saw, in which one limb, and one only, was full of young leaves and flowers, while the remaining limbs were fast losing their foliage. The reason for this partial production of bloom I was not able to divine; possibly it may have had some relation to injury to a certain portion of the root system, in more or less direct connection with the particular branch, but I have no evidence to offer in support of such a guess.

In speaking previously of one modification of unseasonable flowering dependent on activity protracted beyond the customary period, it was mentioned that the flower was in such instances developed at the ends of long slender shoots formed during the course of the summer. In such cases the shoot ends in a flower-bud instead of a leaf-bud, as is usually the case. The conditions are no longer favourable for the extension of the shoot, and the energy of growth is diverted to the production of flower. But in the laburnum, in many fruit-trees, such as the apple and pear, the fruits are normally borne on short thick branches called by the gardeners "spurs." These are very interesting physiologically, as possessing intermediate transitional characteristics, such as those before alluded to, between vegetation and seed-production. In form, these spurs are short and thick, with very narrow interspaces between the leaves, and they bear a cluster of buds which ultimately all develop into flowers, or in which the central and terminal one is a leaf-bud. Internally these spurs are soft and spongy, with a great preponderance of cellular, over fibro vascular, or woody tissue. The cells are moreover filled with starch. We have evidently here got to do with store-places analogous to that furnished by the tuber of the potato and other formations, in which food, or matter capable of conversion into food, is stored up for future use at the growing points; in this case for the formation of fruit. Flowers are occasionally produced on these spurs out of due season; the flower-bud destined for a following season bursts into activity this year, affording an instance of a true *fleuraison anticipée*; but more often, according to my observations, when an untimely flower is produced (especially in the apple), it is from the development of a flower in the central bud of the spur, which is usually a leaf-bud, as above stated. In such a case, then, we have not only an alteration in the character of the bud, but a change in the period of its expansion. A converse illustration to that just given is afforded by a case recorded by Mr. Berkeley, in which a bud of a walnut, which in the ordinary course of things should have produced a female inflorescence in the following spring, was developed in the autumn as a leafy shoot.

Renewal of growth after temporary arrest, "recrudescence" as it is sometimes called, occurs normally in the pine-apple, Eucomis, Metrosideros, and other plants. Abnormally, I have met with it in *Cytisus nigricans*, the common wall-flower, Œnothera, and many others. It hardly differs from the first category mentioned in this note, except in the fact that the new growth is the direct continuation of the old, and not an entirely new lateral formation. It differs from the terminal bud of a "spur," in that the latter is normal as to position, even if developed out of season, whereas in the class of cases now under consideration, the activity of the growing point, which usually ceases with the development of the last flower, is exceptionally continued.

One other circumstance deserves mention, and that is, the rarity with which true fruit, or at least ripe seed, is produced as a result of these untimely flowers. Sometimes, of course, ripe seed is produced; a plum is before me as I write, the seed of which is as perfect, to all appearance, as that of the first crop could have been. But in the majority of the pears and apples which come under one's notice at this unseasonable period, the fruit is there (in the popular sense), but the core, which is in a botanical sense the true fruit, is absent, or, if present, the seeds it contains are usually abortive. Botanical readers will readily see the morphological reason why, and physiologists will recognise, that in such cases the deviation from the ordinary course is not so great as it appears upon the surface, and the action of the "environment" is not so potent as it appears to be at first sight.

To sum up, these cases of unseasonable flowering appear to be due either to continuous growth and development; to renewal of growth after a longer or a shorter period of arrest; or to the development of a flower-bud in the place of a leaf-bud. What produces these changes? To this no more precise answer can be given than has already been afforded. The absolute nature of the change, structurally and morphologically, depends upon the nature of the inducing causes, and varies accordingly; the degree of change may depend simply on the increased or prolonged intensity of action of the same causes which promote natural growth.—Maxwell T. Masters.—*Nature.*

BEET SUGAR-MAKING IN ENGLAND.

THE LAVENHAM EXPERIMENT.

By the end of this month (January), or a few days later, the Lavenham Sugar Factory will be in full work. The delay which has precluded Messrs. Bolton and Partners (Limited) from taking any delivery of beet since the time of harvesting on the farms in October (which must have resulted in a certain loss of saccharine in the roots) has been due to the difficulty of fitting the building with the new machinery in time for the opening of the manufacturing season; and at the present moment it is only one piece of apparatus which is waited for—the whole machinery and plant being supplied by one of the greatest Continental firms, and constructed specially for the novel process now to be introduced. Apart from the exigencies of agriculture in discouraged corn-growing, which may attract farmers to the chances of a new crop, and apart also from the disposition of the railways to accord easy rates of carriage to the factory, there are two special reasons for expecting, even in the face of an unparalleled glut of sugar production, a better fortune for the enterprise than fell to the experience of Mr. James Duncan at the Lavenham factory in 1869 to 1873—one being the progress which has been made in improvement of the beet itself, and the other, the new and economical process of extracting and purifying the sugar. As we pointed out in March last year, the Sugar Association of the Zollverein have developed upon their experimental farm better varieties of beet and improved methods of cultivation, together producing roots richer in sugar and of a higher degree of purity from salts which interfere with the process of sugar crystallization; and by selection and breeding of the plant such an advance has been made also in France, notably by M. Vilmorin, of Paris, that growers can now secure a heavier weight of roots per acre compatibly with the most syrupy quality in the juice.

At the factory there will appear great changes, readily observable to persons who were familiar with the operations of a dozen years ago. The loads of carrot-shaped roots (minus their green crowns, cut off by the growers) will be weighed, but not subjected to any trimming by hand; unless, indeed, a forked and fangy root be dealt with now and then. For, as there will be no rapid rasp grating up the roots into a fine pulp, there is no need for carefully paring off the small rootlets and fibres which used to go away in the drain water—to the clogging and fouling of the brook which flows close beside the factory. And this water-way will not be corrupted and made pestiferous with black char water which used to pour from the charcoal filters, as there will be no such filters. The water-supply will be sufficient, seeing that much less will be required for condensing purposes than upon the old plan; and good water, in addition to that of the natural stream, has been provided by a couple of new wells. The beets, cleansed from adhering soil by the mechanical stirrers and brushes revolving in long vats or washers, will be elevated to the cutter—a machine resembling the root-cutter used by a shepherd—which slices the roots into finger-pieces; and these will be sent down a spout or trough, which delivers a proper charge in turn into each of a series of circular vessels, placed in a ring form of arrangement, for being conveniently charged by the spout as it swings round from the centre like a crane jib. By what is called the "diffusion" process, water of different temperatures at different stages flows continuously through all the vessels in turn, commencing as clear water with each spent charge of beet, and gradually enriching itself with the juice from partly exhausted charges in succession, till it passes, as a rich solution of sugar, salts, and impurities, from the last vessel in which the maceration of the fresh beet is begun. Each of the vessels is emptied in turn of the spent beet, which is carried to the pressing operation, where any sweet syrup remaining is made to exude—the pressed beet, however, still holding enough nutritive material to be an excellent fattening food for animals. This will be loaded upon carts fetching it away at the price of 6s. per ton; that is, half the price formerly paid for the pulp as it came from the bag-presses after the rasp. The solution from the beet will be boiled with lime, which is termed "defecation," and the lime then precipitated by blowing carbonic-acid gas through the liquid. By the old process there would follow a second defecation, and then the tedious and expensive charcoal filtering. But it has been observed that the mineral earth, strontia, as well as baryta, has the property of being able to seize and enter into combination with sugar in solution. Hence the liquor is boiled with strontia under pressure; a yellowish-white sucrate falls as a deposit to the bottom of the vessel; the water, still holding the salts and impurities though it has parted with the sugar, is run out through the precipitate of sucrate on a screen upon the bottom of the vessel, and this material is then treated with carbonic acid in water, which breaks it up, separates and recovers the strontia, and leaves the pure sugar in solution, to be concentrated by vacuum pan, and crystallized in the usual manner. The greatest gain of the new process, however, is that, whereas by the old crystallization process the manufacturer lost some 20 per cent of the saccharine matter of the beet juice, which from contamination of salts could not be crystallized and went away in the beet molasses—a product of low value—the strontia perfectly clears all the sugar from these impurities in the way of crystallization, and extracts up to 95, or more, per cent of the sugar contained in the beet juice. The improvement has been very widely and rapidly adopted; and Messrs. Bolton, who have mines of strontia and other minerals at Fawler, in Oxfordshire, and at Mendip and Malago Vale, in Somersetshire, where they manufacture the natural sulphate of strontia into the carbonate and hydrate, send large quantities of this material to Germany, Austria, France, and some to Russia and Holland, for use in what is named "the Scheibler process." Baryta had been employed in France, but is objectionable on account of its poisonous properties, which are absent in strontia; and at the suggestion of Captain Sir Francis Bolton, M. Hippolyte Leplay, in France, patented an improved mode of using strontia, by which one operation accomplishes the same result that the "Scheibler" process effects in three. This method of Leplay is the one adopted at Lavenham. The process invented by Dr. Scheibler, of Berlin, is applied on the Continent to treating the molasses; but the process to be used at Lavenham will almost do away with molasses altogether, and the patent includes a cheap method for regenerating the strontia after use, which has been a very costly item in treating molasses.

One advantage of the new manufacture is that it is no longer a matter of prime importance that the percentage of salt in the roots should be small. Common salt, for instance, is an objectionable constituent in the analysis of sugar-beet, because its presence in large quantities betrays an inferior quantity of sugar; but potash in the juice is not objected to, and, indeed, as that article is worth about 24s. per cwt., the sale of the ash resulting, will form a considerable item of profit. Messrs. Bolton and Partners trust to meet the abnormally low price of sugar by the virtue of their process in both enhancing the yield of sugar obtained from the roots and in the various ways enumerated, cheapening the cost of production. There is also this general consideration, that they possess important offsets against the operation of the German bounties, in the fact that they will be able to supply sugar factories in England with strontia at a lower price than that for which the chemical can be obtained in Germany; while it is certain that our home factories will be able to market their sugar at a much cheaper rate than the German sugar can be transported to the same centres, Austrian and German sugar paying some 30s. to 35s. per ton, freight charges, and landing expenses, before it reaches our refiners, and their produce again paying railway freight to the interior.

Coming now to the experience of English growers of sugar-beet, in 1884, we have before us the carefully-considered and admirable report of Professor A. H. Church, M A., F.C.S., late of the Royal Agricultural College, Cirencester. The extraordinary dryness of the spring and summer told very unfavourably upon the germination or regular growth of the plant, and it was not expected that more than half a normal yield of roots would be secured on an average. However, upon 640 acres under the crop, upon 60 farms, the total produce turned out to be about 6,85[illegible] tons, or over 10 tons per acre. In some instances the yield was as high as 20 tons; in many cases it exceeded 15 tons, and in a few the produce was so poor as to give less than five tons per acre. On a large proportion of the farms the average was about 12 tons per acre, and the average quantity of sugar in the roots reached about 13 per cent, corresponding to a production of one ton-and-a-half of crystallizable sugar per acre. Professor Church cites the example of the Rev. R. K. Longden, who, at Brent Leigh, Lavenham, obtained 14 tons per acre of shapely small roots, in drills 16 inches apart, upon clean, well-farmed land, a crop which so managed in an ordinary season would have given at least 20 to 25 tons per acre. Mr. G. H. Nunn, on 11 acres near Bury St. Edmunds, grew 18 tons per acre. Mr. Garrett Taylor, on 10 acres near Norwich, grew 14 tons per acre; the roots being 18 inches apart in the rows, averaged, as they should do, less than 1½ [illegible] and were consequently very rich in saccharine, giving 14¾ per cent of sugar. Had the spaces been only nine inches between plant and plant, there would have been double the number of plants and a marked increase of sugar per acre. Great stress is laid upon the importance of cleanliness from weeds, especially couch-grass, of thick sowing, early thinning, careful singling, earthing up exposed parts of roots, cutting off any "bolted" or runaway stems, selecting the proper time for pulling the crop, and drawing without wounding the roots. And Professor Church recommends manuring with nitrate of soda as well as with superphosphate of lime, though farmyard dung ought to be applied to the crop preceding the sugar-beet. Where this has been used directly, especially in the spring, the roots are uneven in size, coarse in quality, and much fanged.

It appears that trial crops have been grown during the past year in Surrey, Berkshire, Oxfordshire, Middlesex, Northamptonshire, Lincolnshire, Staffordshire, Worcestershire, Warwickshire, Suffolk, Norfolk, Cambridgeshire, and Essex, also in Wexford in Ireland.

The year's crops by no means offer a series of exceptionally well-grown and rich roots; yet in only four cases does the percentage of sugar fall below 11; in seven instances it is between 11 and 12, in eight cases between 12 and 13; in eight cases between 13 and 14, in seven cases between 14 and 15, and in three cases between 15 and 16·4 per cent. It is encouraging to hear that the highest percentages of sugar are not generally associated with the smallest yields per acre. Professor Church attributes most of the instances of only moderate success to the farmers treating sugar-beet as a fallow crop and to their neglecting the instructions given for management; and he adds an important note on the value of the beet (not the pulp from the factory, but the root itself) as cattle food. He says:—

"Several of the farmers who have grown these roots have been glad to use a part at least of the crops for feeding their stock; the results have been most satisfactory. Chemical analysis explains the superiority of sugar-beet over other roots for feeding purposes. While mangolds commonly contain 90 per cent of water, and swedes and white turnips often more, sugar-beets will generally be found to average about 81 per cent. Thus a crop of sugar-beet, even though its gross weight may not be much more than one-half that of other kinds of roots, will contain quite as much solid nutritive matter. Moreover, it will present the further advantage of containing less of those saline matters which, without being of use in animal nutrition, tend, by their removal from the soil, to its exhaustion."

It is necessary to state that Messrs. Bolton and Partners have requested their clients, the growers by contract, to defer taking any action towards sowing for the ensuing season until the close of February, when the experience gained by actual working in the factory will enable them to make important decisions for the future. An impression prevails that because of the unlooked-for fall in the sugar market, the enterprising company will not be able to pay a good price for roots. But in any case they will certainly perform their contracts for the present crop; the terms, we understand, having been 20s. per ton for roots delivered at the time of taking up, and 22s. per ton when, as in the present case, the roots have been clamped. The proposal now under consideration is to fix the selling value of the crops of 1885, and future years, according to the quantity of sugar yielded per acre; and it is probable that strict adherence to the scale will bring out some crops worth, if reckoned by weight of roots, up to 20s., and others down to, perhaps 16s. per ton. Messrs. Bolton and the influential members of their company contemplate the *eventual* extension of the sugar-beet industry in many suitable districts of England if the commercial results of the Lavenham trial prove encouraging; and it is very well known that for depth and fertility of soil the Lavenham district has no especial advantage. Indeed, as shown by the comparatively yielding of common mangolds, some tracts of land are capable of producing under similar arrangement one-third, or even one-half, more weight of roots per acre than can be grown on most parts of the area which has been under sugar beet in 1884.—*Times*, January 24, 1885.

LIME.

By Dr. Andrew P. Aitken,

Chemist to the Highland and Agricultural Society.

Lime is found in the primitive rocks in combination with silica, forming silicates. During the process of weathering the silicates are decomposed, and the carbonic acid of the atmosphere unites with the lime to form carbonate of lime, which is insoluble in water; but it is capable of uniting with an additional quantity of carbonic acid, so as to form the bicarbonate of lime, which is soluble in water, and which, when washed down into the rivers, gives to the water that character which is called *hardness.* There are other salts which cause hardness in water, but the bicarbonate of lime is the chief of them. Hard waters are usually clear, because they do not dissolve the vegetable matter out of the soils through which they flow; while waters which contain very little lime-salts are *soft,* and when passing through the soil extract from it much vegetable matter, and become brown coloured. Bicarbonate of lime, as found in water, is easily decomposed; the half of the carbonic acid escapes from it, and there is left behind the carbonate of lime, which, being insoluble in water, is precipitated. When this goes on on a large scale, extensive sediments of carbonate of lime are deposited, and these in course of time form the limestone strata which abound all over the world, and which, though originally formed under water, are frequently found thrown up into great mountain ranges. When limestone is heated red hot in a current of air, the carbonic acid is entirely driven away from it, and lime is left behind. This is the process which is carried on in lime-kilns, the product is variously named lime-shell, hot lime, burnt lime, caustic lime. By this heating process the character of the mineral entirely cha[illegible] from being a mild, indifferent substance it has been converted into a strong base, that is to say, a substance which unites powerfully with acids, neutralising them, and forming lime-salts. If it combines with carbonic acid it is re-converted into carbonate of lime; if with sulphuric acid, it forms sulphate of lime, a substance which is slightly soluble in water, and is found in nature in large quantity as gypsum. When water is poured upon lime shell, a violent union takes place, accompanied with a great rise of temperature, and the stony mass crumbles down into a fine powder, the hydrate of lime, which is known as slaked lime, and which, when pure, is completely soluble in water.

Lime in some form is essential to the growth of plants, so that a soil which contains no lime cannot grow a crop. The amount of lime required by plants is not very great, and it is frequently found that fertile soils contain very little of it. Lime exists in the soil chiefly as carbonate, and as that is the commonest of lime-salts, it is very often spoken of as lime, but, accurately speaking, the name lime should be applied only to caustic lime, which is the base of all lime-salts.

When caustic lime is exposed to the air, it takes up moisture, and crumbles down. Thereafter it soon absorbs carbonic acid, and becomes converted again into carbonate of lime. In such a case all that has been achieved by burning the limestone is an alteration in its physical character. It has been changed from a hard, and perhaps crystalline mass, into a soft, fine powder, easily mixable with the soil, and easily soluble in water containing carbonic acid.

Caustic lime, on account of its solubility, is able to soak through the soil, and travel some little distance in search of acids. The acid which is most abundant in the soil is carbonic acid, which is one of the products formed during the decay of organic matter. About half of the total substance of dry vegetable matter consists of carbon, and in the process of decay this carbon is mostly given off as carbonic acid. The more rapidly the carbonic acid is got rid of, the more rapidly does the rotting process go on. It thus occurs that when a soil contains too much organic matter, as in the case of moss and bog land, the application of lime is found to be of great benefit, because by uniting with the carbonic acid present in too great quantity in the soil and precipitating it in the form of crabonate of lime, it makes room for the formation of more carbonic acid, and thus rapidly increases the rotting process, and reduces the excess of organic matter. There are other acids formed during the decay of organic matter, and with all of these lime unites, forming either soluble or insoluble salts. The former are washed down through the soil, and the latter are precipitated in it. Accordingly, when land has become 'soured,' as it is called, lime is the substance that is required to 'sweeten' it.

The souring of land is due to various causes, and the acids which produce sourness are of various kinds. There are salts contained in fertile soils which are decomposed by the roots of plants, but are not entirely absorbed by them, and when the plant absorbs the base of the salt, and leaves the acid behind, the soil becomes soured. Thus, in the case of potash salts, such as the sulphate and muriate of potash, there are presented to the roots of the plant the base potash, which is much required by the plant for the formation of its wood, while the sulphuric acid and muriatic acid are of comparatively little use; and if the plant absorbs the potash, and leaves the acids behind to form compounds with weaker bases, the land becomes soured from the presence of salts having an acid character. When a strong base such as lime is applied to such a soil, it unites with the sulphuric and muriatic acids, and neutralises them, forming the sulphate and muriate of lime, both of which are soluble salts, which are easily washed down through the soil. But the chief cause of souring in land is the formation of organic acids during the too slow oxidation and decay of organic matter These organic acids especially accumulate in wet soils, where the oxygen of the air is prevented from getting easily at the organic matter to convert its carbon rapidly into carbonic acid and its hydrogen into water so that there are formed intermediate substances, consisting of various combinations of carbon, hydrogen, and oxygen, which are known as organic acids, such as humic acid, and these are injurious to the roots of plants. When lime is applied in such cases the acidity is neutralised, and as the products of decay are removed, the land becomes 'sweetened,' and the rotting of the organic matter goes on with renewed vigour.

If the acids which are present in the soil, or are formed in it, were all of an injurious character, the application of lime would be an unmixed benefit; but this is by no means the case. One of the most valuable constituents of a fertile soil is nitric acid, which is formed by the oxidation of the nitrogenous part of organic matter, and it is of great importance that the store of it contained in the soil should be husbanded as much as possible. It is a soluble acid, and all its salts are soluble, and as it is being constantly formed in the soil, the probability of its being washed down through the soil and carried away by the drains is very great. Recent discoveries which have been made regarding the formation of this valuable material have invested it with a very special interest. Its production is found to be correlated with the life and growth of exceedingly minute organisms, which abound in fertile soils; and the investigation of its formation and history in the soil, which is being carried on by Mr. Warington, at Rothamsted, forms one of the most interesting contributions to the science of agriculture. Analyses of the drainage waters on the Rothamsted farm show that nitric acid is being lost to the farm at all times, and the circumstances which affect the amount of that loss will be again referred to.

When lime is applied to a soil, it combines with the nitric acid in it, forming nitrate of lime, and by so doing gives a fresh impulse to the nitrifying process. If the increased production of nitric acid thereby occasioned is in excess of the wants of the crop, or if it occurs at a time when there is no crop on the ground, there is nothing to prevent the passage of this valuable material downwards through the soil and subsoil and into the drains, where it is lost to the farm. The only thing which can arrest nitrate of lime or other nitrates in their downward course is the roots of growing plants. These absorb it, and bring it up to the leaves and growing parts of the plant, to be converted into albumen, that most valuable constituent of fodder. It is therefore obvious that one unfortunate result of liming may be to encourage an excessive or ill-timed production of nitric acid, and a consequent loss to the fertility of the soil. Caustic lime, when applied in large quantity, is not favourable to the life of nitrifying germs—it is rather destructive to these minute organisms; but as soon as the lime has lost its causticity, that is to say, as soon as it becomes converted into carbonate of lime, by uniting with the carbonic acid in the soil—its presence in that mild form is favourable to the process of nitrification.

But there are occasions when a cautery is needed, and when the application of caustic lime is of special benefit, viz., where the surface of the land has become fouled by the growth of moss and feeble annual weeds. The strongly alkaline action of caustic lime

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Crop and Weather Report.

[FOR THE WEEK ENDING THE 4TH MARCH, 1885.]

General Remarks.—Slight rain has fallen in most districts of Bengal and Assam. In the North-Western Provinces local showers have occurred, and there has been some rain in parts of the Madras Presidency and the Central Provinces, and in the Jullundur District of the Punjab.

There is no change to record in agricultural operations in Madras, and in Mysore the state of the crops continues generally unfavourable. In Coorg the rice crop is being threshed. In the Bombay Presidency, the Central Provinces, and the Berars, the *rabi* crops are being reaped, and prospects are good.

In the Central India and Rajpootana States and Hyderabad, the standing crops promise well and prospects are favourable.

The prospects of the *rabi* crops in the Punjab and in the North-Western Provinces and Oudh are generally excellent.

In Bengal the *rabi* crops are being reaped, and a good outturn is expected. Ploughing for next season's rice crop and pressing of sugarcane are in progress. In Assam prospects are favourabe, and ploughing continues.

Cholera is abating in the Madras Presidency ; small-pox is prevalent in Burmah, and is reported from most other provinces ; in other respects, the public health is fair.

Prices are generally steady.

Madras.—General prospects fair, except in part of Bellary and Anantapore.

Bombay.—*Rabi* harvest continues in parts of 11 districts ; standing crops injured by mildew, blight, and frost in parts of Hyderabad, and by rust and blight in parts of Shikarpore ; scarcity of fodder and drinking water continues in parts of Belgaum and Dharwar ; cholera and cattle-disease in parts of 7 districts, small-pox in parts of 9, and fever in parts of 13 districts.

Bengal.—Some rain fell mostly in the districts of the Presidency, Dacca, and Chittagong Divisions ; it has facilitated ploughing of land for next season's crops ; *rabi* crops are being harvested and promise a good outturn ; *dalua* crop in Orissa is doing well and is in ear in some places ; pressing of sugarcane is going on ; price of rice almost stationary ; cases of cholera and small-pox are reported from some places, otherwise public health good,

N.-W. Provinces and Oudh.—Showers have fallen in a few districts ; some injury to *rabi* from rust and insects, but crop prospects are favourable ; prices steady, and public health good.

Punjab.—Health and prospects good ; prices falling in Peshawur, and generally stationary in other districts.

Central Provinces.—Weather getting hot ; *rabi* harvest continues ; prospects favourable ; prices steady ; fever, small-pox, and cholera in parts.

British Burmah.—A few cases of cholera in Akyab district and Rangoon town and in Thonogwa, Henzada, Amherst, and Shewgyin districts, but nowhere severe ; small-pox more or less prevalent in parts of Akyab, Tharrawaddy, Bassein, and Henzada, Thayetmayo town and Moulmein, chiefly sporadic ; cattle-disease in Tharrawaddy, Bassein, and Thonegwa districts, but not serious, otherwise public health good ; weather sultry.

Assam.—Mornings and nights still cool ; days perceptibly warm ; mustard almost gathered ; ploughing operations for *aus* going on. State and prospects of crops as before ; small-pox reported from the Sudder sub-division ; public health otherwise good.

Mysore and Coorg.—Reports regarding state of crops generally unfavourable and prospects of season indifferent ; drinking water and fodder for cattle scarce ; public health fair ; prices rising in parts.

Berar & Hyderabad.—Weather clear ; days getting warm ; prospects favourable ; *rabi* crops being harvested ; wheat 22 and *jowari* 26 seers per rupee.

Central India States.—Weather seasonable ; prospects of *rabi* and opium good. Health good,

Rajpootana.—Crop prospects favourable ; prices steady ; health good.

Letters to the Editor.

WHEAT IN INDIA.

TO THE EDITOR.

SIR,—You have suggested the application of nitre as manure to increase the produce of Indian wheat. The recent experiments on wheat with different kinds of manures, especially those conducted at Rothamsted, have brought prominently to the notice of the English farmers the very great value of nitrogenous manures, and advantage of this should certainly be taken by the Indian cultivator to increase the produce of his wheat crops. But the subject is not so simple as may be imagined. It is true that the application of nitre or ammonium sulphate will double, and may treble, the produce of wheat, but there are risks in its application which must be guarded against, or failure will result. What those risks are, I shall make an attempt, with your permission, to show. We have certain wealth stored in the soil, finite and determinate in quantity, which forms a capital from which we cannot go on drawing with impunity. Now what nitrogenous manure does, is simply to enable us to make heavy drafts on this latent wealth in the soil. It serves as a stimulant to make the soil give up more of its fruits, but at the expense of future productiveness. It is well perhaps for India that the secret is not generally known, or with the system of cultivation pursued in this country, the exhausting process would be in full swing. In England, farmers as a rule are bound by express contract to follow a prescribed system of cropping, and the landlords there possess the requisite knowledge to understand the value of different systems of farming. A little knowledge is a dangerous thing, and I have no doubt this little knowledge of the secret of nitrogenous manure in wheat would be dangerous in this country ; and I cannot too strongly protest against the use of this manure to any large extent. Half a *maund* of country nitre, as recommended by you, is certainly not a very large dose for a bigha of wheat, but the fear is, and a reasonable one, that the ryot will not stop at half-a-maund, if he should find, as in the beginning he will undoubtedly do, that this application is attended with a marked increase in the yield of the crop, and it is this fear which prompts me to warn the people against the abuse of this stimulating manure. But a greater risk in the use of this manure is still to be mentioned. The character of Indian wheat needs improvement, and it will become worse if grown with the help of nitrogen. Its quality will deteriorate, and the trade accordingly suffer. The recent analyses of Indian wheat, made at the instance of the India Government, have prominently brought to the notice of the public at home the superiority of Indian wheat for the miller. Now this quality will be seriously impaired by growing it with nitrogen. At present, the attempt should be particularly directed to two things—*1st*, to the better dressing of the corn for the market; [illegible], to maintaining the present quality of the sample, if not improving it. On the first point, *viz*., the dressing of the corn for the market, I shall write a separate letter, in which the safest mode of increasing the produce of the crop will also be discussed.

S. H.

NOTE.—We shall be very glad to hear from our correspondent again. —ED., *I. A.*

PROSPECTS OF TEA IN DARJEELING AND THE DOOARS FOR 1885.

TO THE EDITOR.

SIR,—The past month has seen the close of pruning. Managers are now, during their leisure time, repairing coolie lines, making mats, *chalnies*, *tookries*, *etc.*, for the coming season. Labour is plentiful. Want of rain is telling on the young plants in the light-soil lands, and in some spots the old plants look sickly. It is not expected that we shall have an early season, unless we have rain during the next fortnight. Estimates on old gardens are not in excess of last year, as it is found there is a slight deterioration on old plants year by year, necessitating the cutting down of old bushes, or heavy manuring; the latter process, unless some new and cheap remedy is found, is not profitable. There is no doubt the soil is becoming poorer year by year. Hence it is believed that this is the cause of our teas not being so good as they were in days gone by. If planters would utilize their women and boys in carrying fresh soil and manure on parts of their gardens year by year, in the winter season, or dig up the level gardens and mix this soil with a certain amount of chemical manure, there is little doubt that they would get a larger out-turn, and increase the quality of the tea at but a small expenditure. The pests—red spider, moth, green fly, and mosquito blight—are much dreaded by planters, and many an estimate and planters' reputation have been ruined by them. A remedy in the way of an insect poison, that has neitheir taste nor smell, was successfully used last year by a person in the Darjeeling district, and we believe the remedy can be obtained in the shape of a powder in tins, at the "Indian Supply Association," 10, Dalhousie-square. This remedy, we hear, is not a total cure, but checks the pests, and diminishes the ravages of the mosquitos and greenies to a point which is nominal. We read Mr. Cruikshank's speech of last week in the newspapers; and we think that the tea-agents should set the good example by reducing their commission by at least 1½ per cent; this would help the gardens considerably. There is an old saying—starve a horse, and he won't gallop. This we might apply to coolies; if they are well fed they can work well—but if fed and paid badly, they will not do much work. It is better to pay a trained and acclimatised coolie a small bonus, than to get up a raw man from his own country. The supernumeraries attached to a garden are often useless. This should be looked to. Managers are often insufficiently paid. They risk a great deal in a bad climate, and it is a very rare thing to ever hear of a planter retiring. Many go *home*, and many go home to die. Did any one ever see a tea planter who has lived in the plains all his life 50 years old? It is proposed at home to increase the duty on tea. If they do, we shall be the people to suffer. If England wants the support of her colonies, she must put a duty of 1 shilling per lb. on China tea. India can give England enough tea for all her wants, provided the duty is not raised.

R. RECNEPS.

WHEAT-GROWING.

TO THE EDITOR OF THE TIMES.

SIR,—It will interest many readers to know that Major Bell, the projector and present worker of the great Canadian wheat farm of 100 square miles, is now in London on a short visit. At the recent expedition of the British Association to Canada, those of its members who got so far west were entertained at the Bell Farm, and were driven over the great plains of wheat which were then on the point of being harvested. The facts witnessed were seen to have an important bearing upon the supplies of wheat for our people in England, and upon the chances of those of our farmers who still propose to grow cereals or pulse.

Last autumn I devoted a long holiday of two months chiefly to visiting the farmers who are now dotted about upon the vast alluvial plains of North-West Canada. I spent a week in wandering about at the end of the track of the Canadian Pacific Railway in the Rocky Mountains of British Columbia; I spent another week in the city of Winnipeg; I went about among the still living old Scotch settlers who went out with Lord Selkirk, and who still crop their original farms upon the beautiful banks of the Red River, where he so wisely located them; and, among other places, I visited the Bell Farm. I have also had the advantage of prolonged conversations with Major Bell during his present visit to London. The Major tells me that he would gladly attend any meeting to give an account of his agricultural operations and to answer inquiries; but as only a few people can hope to come into personal contact with him, I may, perhaps, shortly call attention to the *data* with which we are now furnished.

The Bell Farm contains 100 square miles of rich alluvial land practically all fit to put the plough into, and perfectly unencumbered by timber. Its location is in Assiniboia, upon the Canadian Pacific Railway, 312 miles west of Winnipeg. It has its own railway station, which is known as Indian Head, and the whole of this land is being rapidly brought forward for wheat-growing—the school and public building sites only excepted. At the railway station is an elevator where the grain is lodged and from which it is delivered into the railway cars—each car-load being 500 bushels and weighing 30,000 pounds. The wheat is sold by the bushel of 60 pounds weight, and not by measure, inasmuch as large quantities of wheat can be weighed out much more easily than they can be measured. Some of the wheat grown on the Bell Farm has weighed 66 pounds per bushel, but in such case the farmer has the advantage of selling by weight. With poor wheat he would have to bear the disadvantage. Comfortable houses are already built for the labourers; the Major and his family have a handsome residence such as would satisfy a gentleman farmer in England. The horses and cattle are properly housed; a perfect system of book-keeping shews every detail of the expenditure and other produce; and there are around the Major a number of active young fellows—his pupil-assistants—who are learning to farm with a view to start for themselves at the end of a year or two.

During the 1884 season the Bell Farm has raised 130,000 bushels of grain, and there have been in crop about 6,000 acres. The acreage in crop and the produce of the season 1885 are expected to be double those of last season. The cost of the wheat thus grown has to-day been kindly written out for me by the Major. The figures are in decimals of a Canadian dollar—*i. e.*, in cents, of which 100 are equal to 98·6 English halfpence. The cost as given below is per bushel of 60 pounds weight, delivered from the Bell Farm elevator upon the railway station at Indian Head. It is as follows:—Labour, $·07; horses, $·036; maintenance of labourers, &c., $ 033; cost of seed, amount written off capital account for depreciation of horses, implements, stock, &c., and 8 per cent upon the purchase money, &c., of the land in crop $·20; total, $·34.

Now, multiplying the 34 cents by eight we get the net cost per quarter of the wheat as 272 cents. This is 11s. 2d. English money. But this is wheat receivable from the elevator at the Indian Head railway station, 312 miles west of Winnipeg, and we have to provide for its transport to England, a distance of 5,000 miles. The cost of transport from Indian Head to Liverpool during the last year has been, Major Bell tells me, 11s. per quarter, and during the coming years the same rate of freight is expected to rule. This, then, makes the fine hard red Manitoba wheat deliverable in Liverpool so as to pay 8 per cent in capital invested in land in North-West Canada, so long as wheat shall not fall below 22s. or 23s. per quarter.

It is obvious that, as soon as these facts are realized by English farmers, they will begin to consider whether they shall struggle along and lose money in attempting to grow cereals and pulse in England, or whether they shall take their capital, found themselves new homes in this great Canadian territory, and grow rich. To our idlers at home who have been living upon rents derived from arable land, the facts are not less interesting. To them it means a denudation of which no adequate conception has yet dawned upon their minds. They will have to work or to starve. It is hardly too much to say that these facts mean a silent but inevitable revolution in the position of the territorial aristocracy of England.

It behoves me to add some words more. In all my cross-country wanderings in this great North-Western territory—one railway taking me more than 1,000 miles in a direct line over unbroken alluvial plains—I never met one man who deserved to succeed who had not had a real and substantial success. Loafers, idlers, and drinkers go to the bad there rather more quickly than at home. It is not a place for feeble, worn out, or aged people to go to. Speculators will only make fortunes if they have large capital and the wit to invest it wisely; they will not make fortunes because the Canadians are fools by the side of raw English colonists. But the healthy, respectable English farmer with a few hundred pounds, who settles down with the intention to work and to do his duty will be sure to succeed. He will grow rich ultimately as the country advances, in some cases very rich, and will live a comfortable, free, and happy life. No country in the world is healthier than these great alluvial prairies.

Just now every emigrant over 18 years of age is entitled to a half-mile square of this beautiful land on paying a survey fee of two guineas. He is entitled also to pre-empt the adjoining half-mile square on gradual payments amounting to 10*s*. an acre. And as on bringing this fairly under cultivation the Government returns 5*s*. an acre, it will be seen that for the sum of £42, the emigrant begins with a freehold from half-a-mile deep and one mile long. Three hundred pounds will build a wooden house, provide implements, and oxen, and keep the emigrant and his family till the crops are harvested, and thenceforth he begins to save money every year.

JAMES EDMUNDS, M.D.,
Medical Officer of Health for St. James's, Westminster.
Grafton-street, Bond-street.

Editorial Notes.

In connection with the agricultural crisis at home, a large meeting, principally composed of East Essex farmers, was held at Colchester, under the presidency of the Mayor, to consider the present critical condition of agriculture. It was resolved to send a deputation to the Prime Minister, and also to Sir Stafford Northcote, with reference to the crisis. Among the speakers were Mr. J. Round, M.P., the Hon. C. H. Strutt, M.P., and Mr. R. K. Causton, M. P. On the suggestion of Mr. Causton, a committee was appointed, with instructions to draw up a statement, showing what it considered the best means of remedying existing difficulties. The committee was further instructed to report to an adjourned meeting, to be held in a month. Mr. Causton remarked that he thought it hopeless for farmers to ask for a return to protective duties on corn. Suggestions that tithes should be abolished were received with cheers.

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In India, owing to climatic influences, and the ignorance of the masses in regard to the elementary principles of chemical science, milk, that necessary of life for the million, hardly keeps good for even a few hours after it is drawn from the cow. It is otherwise in Europe. By the latest accounts we hear that, under the presidency of Mr. Kappeyne van de Coppello, a lawyer, of Amsterdam, a meeting of nearly a hundred farmers and persons engaged in industrial pursuits has been held at Hoorn, in the province of North Holland, to discuss the project of Messrs. Scheuer, from Amsterdam, and others, for the establishment of a London Dairy Supply Association. The intention is to build four ships, of 720 tons each, which will convey daily 100,000 litres of fresh Dutch milk to Harwich, from Amsterdam, whither it would be brought in ice-waggons of the Dutch Railway Company, and ice would be also employed in the carriage from Harwich to London. The *Société Anonyme* would have a capital of 1,700,000 guilders, and its promoters urge that if only 100,000 litres of milk could be sold in London at the price of 2⅜*d.* per litre, there would be a revenue of 412,500 guilders per annum, or 24 per cent upon the capital. With a supply of 150,000 litres daily, the revenue should be 1,629,050 guilders, or more than 57 per cent. The milk would always be dispatched without mixture of water, by special trains, and sold to a certain number of agents in London, who would sell it in smaller quantities at far lower prices than are at present charged. Before commencing the enterprise, the meeting—which expressed itself disposed to entertain the views of the association—decided to appoint a committee to ascertain how long the milk at different temperatures will keep good. The enterprise appears likely to be carried out.

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A most interesting paper has just been published by the Madras Government on the use of the coca leaf as an anæsthetic. Messrs. Hind & Co., of Calicut, had sent to Mr. Logan, the Collector, a small quantity of what is considered in London a superior sample of prepared Coca leaves valued at 10*s.* per lb., and asked for full and reliable information in regard to the best and simplest process for preparing the leaf for market. All that they know at present on the subject is that the leaves should be prepared almost in the same way as tea—only not rolled,—fermented and then kiln-dried. Mr. Logan says that both Mr. T. J. Fergusson and he have well-established plants of *Erythroxylum coca* in their gardens ; that the plant seems to thrive admirably in their gardens, that it seeds freely, and is easily propagated. From an article in the *Morning Post* of the 3rd December last, it appears that what seems to be an exceedingly important discovery has been recently made by an Austrian physician. It has long been known that the leaves of the coca plant contain an active alkaloid, but it has been reserved for Dr. Koller of Vienna—though of course the originality of the discovery is already in dispute—to find that it operates as a powerful local anæsthetic. In the United States it has been used with complete success in ophthalmic surgery, and has also been employed for operations on the mouth, ear, and throat. There seems to be no discomfort whatever connected with its application, and the particular surface affected is made completely insensible to pain without any loss of consciousness on the part of the patient. In the case of the eye, the mere introduction of a few drops of the solution is sufficient to produce anæsthesia for something like half-an-hour, and severe neuralgia is said to vanish before it. It has thus far been little used in this country, partly, perhaps, from the difficulty and cost of obtaining it, for the supply is not equal to the present demand, and it fetches half-a-crown a grain. But we may assume that it will soon be imported in sufficient quantity, and that it will be found, as one of our medical contemporaries prophesies, an exceedingly important addition of our therapeutic armoury.

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"Wheat in India" is the title of a paper just issued by the Government of India in the Revenue and Agricultural Department. From statistics supplied by the Government and heads of the several Provinces in which wheat is grown, it appears that there has been a great falling off in the area under wheat in the Central Provinces—4,179,982 acres in 1881-82, and 3,619,701 acres in 1882-83, but the former figures are not considered reliable. "Wheat is very little grown in Madras, Ajmere, Assam, and Bengal (except Behar). The average area under wheat in India is about 26 million acres, and the average gross production is nearly seven million tons. Wheat is raised under extraordinary diversity of conditions. In the North-Western Provinces and parts of the Punjab, manure and frequent waterings are thought essential to secure a good crop. In the northern districts of the Punjab, the winter rains obviate in a great measure the necessity for irrigation, while in the Mooltan country and in Sind the wheat crop depends on inundation canals drawn from the snow-fed rivers. In Rajpootana what little irrigation exists is obtained from tanks and catchment basins, and the finest crops are sometimes seen in the dried-up beds of these reservoirs. In Central India and the Central Provinces and parts of Bombay the moisture-holding cotton soil, which everywhere predominates, and a heavier rainfall enable the cultivator to dispense with irrigation. The cultivation is in those tracts far less careful in character than in Northern India, and both the cost of production and the outturn is less. In the Punjab wheat appears to be most extensively grown in the districts of Ferozepore, Rawul Pindee, Sealkot, Lahore, Hoshiarpore, Jhelum, Umballa and Guzerat ; of the total imports in 1883-84, 3,50,829 maunds were from the North-Western Provinces and Oudh. No wheat was imported by river. In the year 1882-83, 2,40,082 maunds of wheat were sent to Howrah, and an almost equal quantity in 1883-84. In the former year 2,18,897 maunds of wheat were forwarded by rail to Bombay, and in the latter year, 14,33,576 maunds. Nearly all the traffic went by the Rajpootana route. The amount of wheat that comes to Calcutta from the Punjab is insignificant, compared with the exports to Kurrachee ; Sind taking 33,67,354 maunds. The Deputy Commissioner at Sukkur, who registers the Indus boat-traffic, is unable to account for the considerable increase of wheat which went down the Indus from this province in 1883-84 Nearly all the wheat must find its way to Kurrachee, whence it is exported to Europe. The following extracts from the review by the Government of India in the Financial Department on the accounts of the Sea-borne Foreign Trade of India for 1883-84, however, explain, in a great measure, the cause of the traffic in wheat between the Punjab and Kurrachee being so brisk : "The considerable increase in the imports into Sind was due mainly to the great stimulus given during the year to the export trade in wheat and seeds, which attracted shipping in larger numbers than had ever been seen before in the port of Kurrachee. The extension of the British settlements in Biluchistan also led to a larger demand for goods, which reached consumers in those parts mo conveniently from Kurrachee. The augmentation (in exporte merchandise) in Sind was extremely large owing to the demand for wheat and seeds, especially the former, Kurrache having become, with the completion of the line of railway, th great outlet for Punjab wheat."

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The total import of wheat by rail into the North-W Provinces and Oudh were 2,61,535 maunds as against 3,70 maunds in 1882-83. There was a decrease in the imports from the Punjab and an increase in those from the Central Provinces. As compared with the year 1882-83, there was an increase of nearly 34 lakhs of maunds in the export of wheat which is accounted for by the fact of a large demand from Europe in consequence of the unfavourable prospects of the red winter wheat in the United States. Calcutta still takes a greater share of the exports than Bombay, though the latter has been brought into closer connection with the western half of these provinces by the opening of the Rajpootana-Malwa Railway. The main granaries in these provinces for export purposes are Oudh, Meerut, and Rohilkhund. Wheat trade is also carried on with the foreign countries of Thibet and Nepal. The quantity of wheat imported by rail into Bengal was 72,56,557 maunds against 45,19,020 maunds in 1882-83 and 49,24,795 maunds in 1881-82. During the past year an impetus was given to the trade in wheat in consequence of the freight by sea from Calcutta being very low, and that by railway having been reduced in 1882-83. Exporters were thus able to compete on better terms with America in the London wheat market. Eighty-three thousand six hundred and ten maunds of wheat were imported by rail into the Central Provinces. The exports were 77,08,223 maunds against 57,13,093 maunds in 1882-83. Of the total wheat exported, more than half was sent from the Nerbudda block, which is fed by Saugor and the foreign territory lying beyond. This block is at present the most important wheat-producing area in these provinces. Wheat is largely cultivated in the districts of the Nerbudda Valley and in those in the extreme north of the provinces. It is also extensive in the Satpura hill region, and in the Wardha and Nagpore districts to the south-west of it. There is little or no cultivation in Nimar and the other parts of the province. Mr. Fuller, writing in 1882 on the subject of wheat cultivation in the Central Provinces, stated that "the thinness of population and consequent large extent of individual holdings offer more inducement to low farming on a large, than to high farming on a small, scale. The outturn of the land is actually far smaller than in more crowded tracts, whilst the surplus produce per head is considerably larger, since the poorer the cultivation the larger is that proportion of the produce which results from natural forces as opposed to the labor of the cultivator." He further remarked that the large export trade of the Central Provinces "lies, not so much in the productive power of the soil as in the scarcity of the population which derives its food from it." A very large proportion of the exports was taken by the Bombay port, the main outlet for these provinces.

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In the Bombay Presidency wheat is most extensively raised in the districts of Kandesh, Nasik, Ahmedabad, Ahmednuggur, and Dharwar. No wheat is grown in Ratnagiri, Kolaba, and Kanara. The largest imports are from the Central Provinces and the Punjab. Most of the wheat trade with the Bombay port was as usual monopolised by the former province. The Punjab also had considerable dealing in this respect with the port, but it imported as much as 3½ lakhs maunds from the North-Western Provinces and Oudh. In addition to the 1,03,43,337 maunds shown as imported from external blocks into the Bombay port, 17,85,951 maunds came from the internal blocks of the presidency to the port for shipment to Europe. The total quantity imported by rail into the presidency aggregated 1,04,69,057 maunds against 98,52,382 maunds in 1882-1883. The wheat imports by road into Bombay aggregated 5,84,470 maunds against 8,46,382 maunds in 1882-83. This great falling off is due to the rainfall being excessive and unseasonable. The wheat exports by rail were 40,619 maunds, and those by road 77,844 against 24,40,761 maunds and 71,224 maunds, respectively, in the preceding year.

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In Sindh, Shikarpore is the only district in which wheat is grown to any considerable extent. The trade, as at present registered, is with adjoining native States, *viz.*, Bhawalpore, Jessulmeer, Jodhpore, Khairpore, Cutch, and Gujarat. Arrangements have now been made for registering the rail-borne and river-borne traffic between Sindh and the Punjab. This is a step in the right direction, as the trade between these two provinces is becoming very extensive, 33,67,354 maunds of wheat having been exported by rail and 15,95,221 by river from the Punjab to Sindh (Kurachee). The foreign export trade of Sindh has recently been very active. Last November 7½ lakhs maunds (547,305 cwts.) of wheat were shipped from its ports against nearly 5 lakhs maunds (346,252 cwts.), during the corresponding month in 1883.

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In Berar 6,706 maunds were imported by rail and 1,11,974 maunds by road as against 1,748 and 12,60,186 maunds, respectively, in the preceding year. The falling off in the road-borne trade is attributed partly to the exceptionally wet season of 1883-84 which impeded the traffic, partly to the somewhat low state of the market for wheat, and partly to an unfavorable outturn. The low prices which ruled for this grain apparently tended to check the exports: 6,49,600 maunds of the total exports were conveyed by the Great Indian Peninsula Railway to Bombay and other stations west of Berar. Wheat is not imported to supplement the food-supply of the province. It is altogether an article of export trade. It is cultivated on the rich black soil of the Purna Valley, and on the loam that is found above the Southern Ghats.

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Mr. O'Conor, Assistant Secretary to the Government of India, Financial Department, in reviewing the sea-borne trade returns for 1883-84, has noticed the immense increase in the export trade of wheat during the years 1881-82 to 1883-84. He anticipated that there would be a decline in the trade of the current year, and this prediction has been fully verified. "In the review for 1882-83, it was observed that the exports for the first three months of the year 1883-84 were about half of the whole exports of the previous year, but a doubt was expressed whether the trade would continue for the rest of the year on the same scale. The doubt was verified. If trade had continued on the same scale the exports would have been nearer 30 than 21 million cwts. Exports fell off sensibly after the first half of the year, and though by the end of the year they were 48 per cent in excess of those of 1882-83, they exceeded those of 1881-82 by only 5½ per cent—an increase which would not have been much for one year's trade and which was a small one for two years' trade. During the current year there has been a further decrease in the quantity exported, which for the first four months of the year amounts to only 5,903,916 cwt., a quantity which would represent, at the end of the year if trade continues on the same scale, not more than 17,700,000. But it is probable that before the end of the year, there will be a further material decline in the trade. The decrease indeed would already have been more marked had it not been that merchants had made large forward contracts both for tonnage and for delivery of wheat in the European markets. It has been more than once pointed out in these reviews that the trade in Indian wheat must be one of a very uncertain and fluctuating character. Its continuance on a very large scale depends on the concurrence of a number of circumstances: (1) abundant crops in India, (2) crops below the average in the United States and in Europe, (3) low rates of freight, (4) low rates of exchange. When all these exist together, the supply of Indian wheat which will be put on the consuming markets will astonish—as they have astonished—those who are but imperfectly acquainted with the capacity of India for the production of this grain. When one or other of them fails, the margin of profit, which is so slender at the best that exporters must work on a very extensive scale to obtain appreciable returns, shrinks in such a degree that the export will be carried on either to fulfil engagements already entered into, or as an unavoidable alternative to paying for imports in money. This year the second of the factors which must be present to make the wheat trade profitable has been absent.

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"The harvests have been abundant in the United States and in Europe, stocks in hand are large, and the supplies in existence or in prospect are so considerable that the price of wheat in England has fallen to as low a point as has been known for a hundred years. Prices have not similarly fallen in India, and though it has been stated in a very positive way that India can produce wheat at a much lower cost than the United States—an assertion to which I ventured, for reasons given, to demur altogether—the fact remains that India, in present circumstances, cannot afford to sell her wheat with profit for the price offering in London of 37*s.* a quarter and even less. In the first week of 1884 the average was 39*s.* a quarter, and by the end of February it had gone steadily down to 36*s.* 11*d.* Then there was a rise to 38*s.* 1*d.* by the end of March, and the average for the three months was 37*s.* 9*d.* In April it was 37*s.* 2*d.* and in May 38*s.* 2*d.* The price fell to 37*s.* in June, and the average for the three months was only 37*s.* 6*d.* a quarter. Since then prices have actually fallen as low as 34*s.* a quarter. Now, to leave a profit at all, Indian wheat must sell for 39*s.* or 40*s.* a quarter when prices in India and freights are both low. Everything at present points to the continuance of low prices for another year at least. The crops of the United States are the largest they have ever had, exceeding the average crop of the last five years by 60 million bushels according to careful estimates. The English harvest has been abundant, and the area under wheat was larger than in 1883. The production of all European countries, Russia, France, Italy, Southern Europe generally, and of the Australian Colonies, has been above the average. There is not therefore a bright prospect, as far as can be seen at present, for Indian wheat for the next twelve months, for it is not unlikely that prices may touch even a lower level than that already reached. To make the trade profitable, even possible, in these circumstances, it is essential that the charges, which weigh on Indian wheat between the time when it leaves the cultivator's hands and its arrival in the stores of the European millers, should be lessened. Lower cost of transport in India, lower rates of ocean-freight, reduction and elimination of unnecessary handling at railway stations and ports of shipment, the substitution of expeditious methods of loading and unloading for the clumsy and primitive methods now obtaining, more care in cleaning and classing the grain, are indispensable."

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In connection with Mr. O'Conor's anticipations as to the decline of the foreign export trade of India in wheat, the following extracts from the *Pioneer* of the 3rd instant will be found interesting :—"The Indian wheat-grower may derive some consolation from the knowledge that if the American farmer has this year prevented the export of wheat from India, he has ruined himself in the process. Nothing is clearer than that wheat cannot be grown at a profit in the United States if the selling price is less than 33*s.* the quarter in the London market. With the present rates for wheat in Europe, the American farmer is simply ruined, and the American papers have shown conclusively that the western farmers are getting less for their wheat at the place of production than it had cost them to grow." * * * "Another year of equally low prices would shut up thousands of farms in the far west, and already it is reported that the area under wheat this year in the States is 15 per cent less than in 1883-84. The American farmer is obliged to force his wheat on the European market, as he must convert his produce into cash, and there is comparatively no internal demand in his own country for it." * * * "The Indian producer grows a variety of crops, and can sell the most profitable produce and store the rest. When wheat prices fall, he buries his wheat, and takes his sugar or his barley to market. Again, there is a great internal demand for wheat in India, and this is capable of great expansion whenever wheat is cheap. Thousands of persons in every district will eat wheat in preference to barley or bajra whenever it falls below 20 seers the rupee. As it rises above this rate, the internal consumption contracts." * * * "The producer is getting lower prices than he probably expected, but he is not being ruined like his American rival, and he is getting a better price at the place of production for his grain than the latter. If Indian wheat prices were regulated as American wheat prices are, solely by the English market, and if Indian wheat had to be sent to Europe for sale at any price, we should then witness ruinously low prices in the up-country markets."

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Some information will now be given as to the price that will probably suffice to take a quarter of wheat from India to London. Mr. W. C. Benett, when Director of Agriculture and Commerce, North-Western Provinces and Oudh, last July, stated that the prime cost of raising a quarter of wheat in the North-Western Provinces and Oudh was about Rs. 9-8-0 or 15*s.* 10*d.*, and of putting it into the Cawnpore market, Rs. 12 or 20*s.* He calculated that the railway freight of a quarter of wheat from Delhi to Bombay would be 6*s.* 6*d.* and from Fyzabad to Calcutta 5*s.* 2*d.* He took the freight by sea as 35*s.* a ton or 7*s.* 9*d.* a quarter from Calcutta and 30*s.* a ton or 6*s.* 8*d* per quarter from Bombay. The price of exporting a quarter of wheat from these places to London would therefore be—

	From Delhi.		From Fyzabad.	
	s.	*d.*	*s.*	*d.*
Prime cost at market	20	0	20	0
Railway freight	6	6	5	2
Shipping do.	6	8	7	9
Total ...	38	2	32	11

The average price of wheat in the English market was put down by Mr. Benett at 40*s.* per quarter. According to these figures there would be left for incidental charges and profit 6*s.* 10*d.* for Delhi and 7*s.* 1*d.* for Fyzabad.

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The following were the approximate cost price and transit charges of exporting wheat from Lahore to London *via* Kurrachee :—

	Per quarter.	
	s.	*d.*
Average price at Lahore	17	0
Railway charges to Kurrachee	7	5
Ocean freight at 35*s.* per ton	7	9
Total ...	32	2

The price of exporting a quarter of wheat from America to London appears to have been as follows in 1882-83 :—

	s.	*d.*
Market price at Chicago	32	11
Railway charges to New York	6	2
Ocean freight to London	2	4
Total ...	41	5*

The lowest market prices in London then being 46*s.* per quarter for American wheat, 4*s.* 7*d.* were left for incidental charges and profit. Prices have fallen off since then, the latest and highest quotations being 37*s.* for American and 35*s.* for Indian wheat. The prospects of the wheat trade appear to be somewhat gloomy at present, but lately prices have shown a tendency to rise in the London market. Two statements are given, showing—(1) the wholesale prices of wheat per maund in April 1883 at the principal marts ; (2) cost per ton by rail from Cawnpore and other places to Calcutta, Bombay, and Kurrachee. More recent information will shortly be given regarding the wheat movements in India, and the price it will take to send a quarter of wheat from the principal marts to London through the ports of Kurrachee, Bombay, and Calcutta.

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Indian and China tea-growers had better look to their laurels. The Russian Government, which have been experimenting for some time past in the cultivation of tea, are once more putting forth all their energy to develope the tea plant in Central Asia. They have decided on laying out a plantation at Soukhum Kale, and import a ship-load of Chinese coolies to work it. Here they have followed in the footsteps of the British Consul at Tiflis who, not very long ago, grew a quantity of tea, and during the course of last summer, a German, who tried an experiment with a number of shrubs imported from China, succeeded to some extent. These, however, have been one and all tentative measures, and give one result in establishing the fact that tea can be cultivated in the Caucasus ; but the important problem yet remains undetermined, whether it can be grown on such a large scale as will enable it to compete successfully with the article which is produced in India and China. As matters at present stand, all the tea consumed [illegible] Russia has to be imported, that is, 72,000,000 lbs. have to [illegible] purchased at a cost of £6,000,000. Half of this quantity [illegible] conveyed to Russia overland across Siberia, and the other half borne by water to Odessa in the Black Sea and Kronstadt in the Baltic. If the experiment to be tried at Soukhum Kale is a success the foreign article will be at a discount, since Soukhum Kale is only a couple days' run from Odessa. But there is another and an important factor in a consideration [illegible] question; labour is at a premium in the Caucasus, and the moist climate of the country would materially interfere with emigration on a large scale. In this respect, the Indian and China coolie have the advantage, and besides, there not being much capital in the country for the develpement of the industry the assistance of foreign capitalists must needs be called in, and here the difficulty begins. Be that as it may, we have no doubt Indian tea-growers will watch with some interest the operations of the Russian Government in this direction.

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CANADA is to a have Department of Agriculture. The Select Committee on Agriculture appointed by the Dominion Parliament, has just presented its report, which recommends that the Government should take into consideration the advisability of establishing a Bureau of Agriculture, and an experimental farm in connexion therewith; that this Bureau be formed in connexion with, and under the supervision of, the present Department of Agriculture; that the objects aimed at in the establishment of such bureau and farm be as follows:--1. To conduct such experiments in the introduction and culture of new varieties of seeds, plants, trees, &c., as will most efficiently aid in the advancement of Canadian agriculture, to institute experiments with regard to the comparative value of fertilisers, the proper testing of seeds as to vitality and purity, and the healthy preservation and productive condition of plants and animals. 2. To make careful investigation into the origin, distribution, and the habits of insects, injurious and beneficial, and the contagious and other diseases to which animals and plants are subject, in order to arrive at the best method of destroying and counteracting them. 3. To study the quality of the various breeds of cattle and other domestic animals, with the view of reporting on the best means of improving them, of protecting them from parasites and epidemic diseases, of feeding them for the market, and on the treatment of milch cattle. 4. To initiate and carry out a convenient and comprehensive system of gathering the latest and most useful information, statistical and otherwise. 5. To publish and send to the press and the various agricultural and horticultural societies of the Dominion, at different periods of the year, bulletins giving the results of trials made on the experimental farms, and whatever other information the Bureau may consider useful, either in the prevention of the ravages of insects and contagious diseases, concerning improved methods of culture that have stood test, or for the special advancement of any line of agricultural pursuits.

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THE official memorandum upon Indian wheat quoted by us in a recent article upon the subject, estimates the total wheat crop of British India to be 135 million cwts., or about 7,000,000 tons, and the average yield a little more than nine bushels per acre, or 560 lbs., against 28 bushels per acre in England. According to the same memorandum, the total export of Indian wheat in 1883 was 22½ million cwts., and that export is supposed to have been made, without any appreciable effect in raising prices. And the writer infers that with a favorable rainy season following an average wheat crop so as to secure the autumn or *khureef* harvest, one-fifth of the Indian wheat harvest may be spared for export, without materially enhancing prices. Of the total quantity exported in the year 1883, nearly one-half, 11,243,497 cwt., went to the United Kingdom. For the last few years, the British Isles have been the great market for all surplus Indian wheat, that market until very recently having been monopolized by Russia and America. Before 1880, India held a very insignificant place amongst the great sources of supply. The following table shews the respective quantities of wheat imported into the British Isles from Russia, the United States, and India since the year 1879:—

	1879. Cwts.	1880. Cwts.	1881. Cwts.	1882. Cwts.	1883. Cwts.
Russia ..	7,975,144	2,880,108	4,018,895	9,671,021	16,293,358
United States ..	35,976,805	36,089,869	36,038,074	35,059,623	26,065,832
British India ..	357,256	3,247,242	7,308,842	8,477,470	11,243,497

From this table, it is evident that the import of Indian wheat had become a main factor in the English supply, and was steadily increasing in importance and in bulk. India was in fact underselling both Russia and America in the British wheat market from 1879 to 1884. Owing to a combination of causes that we need not enter upon here, the wheat-growing area in England is steadily diminishing, and the dependence of the kingdom upon foreign corn increasing every year. In 1879, the total quantity of wheat imported into the British isles was 59,368,140 cwts. against 64,080,444 in 1883. It is to the interest of India and England alike, that this want should be supplied as far as possible from India alone, on many grounds, and in our previous article upon this subject, we have shown with what little difficulty the gross outturn of the Indian harvest might be indefinitely increased. Less than six million tons were found sufficient last year for consumption in India, and if we could raise the harvest from 135 millions to 270 by improved farming, *i.e.*, from 560 to 1,120lbs. per acre, there would be a margin of 7½ million tons for export, or three times the entire quantity required to supplement the English harvest—that is, it would cover the total quantity of foreign wheat imported in England, to supply the deficit of home growth, three times over. The demand for Indian wheat is daily increasing in the British market, and the Indian Government should grasp the idea of supplying this demand. We have suggested a resort to nitre as a practical improvement of wheat cultivation, but no system can claim infallibility. That which succeeds in one place is found useless in another. The great thing is the steady and enlightened pursuit of a given end.

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A VERMONT newspaper, the *Rutland Daily Herald*, is printed on paper made from sawdust, the product of Mr. POND's roller pulp machine, by which sawdust, shavings, chips, and pieces of wood can be made with great rapidity into a pulp of clean, fine fibre. This machine will also manipulate the stalks of cotton, sugarcane, wild hemp, &c., at the rate of from two to three tons of dry pulp per diem. The resulting pulp is far superior to any other form of wood pulp, because the fibre is preserved intact and the cellulose is left with it, giving it great strength, softness, and pliability. The tensile strength, per square inch of newspaper, which contains from 50 to 75 per cent of ground wood pulp, is from 8lb. to 12lb., and stands a test of 17lb. to the square inch, showing that it is much stronger than paper made from one-third rags. As all kinds of paper can be made from this pulp without the addition of rags, cotton, or jute, it can be manufactured at a reduction of from 30 to 50 per cent of the present cost. The unbleached pulp is also useful for wrapping paper, and is equal in colour and strength to the best manilla. The woods most adapted to the process are the soft woods, such as spruce, fir, pine, poplar, and hemlock, the latter making the strongest fibre, being quite equal to jute in strength. Besides the manufacture of paper, the pulp can also be utilized for wood ware, such as pails, barrels, and mouldings. Our Indian mills might take note we think of this new practice. The *renaissance* in Europe was largely attributable to the discovery of 'how to make paper,' and the cheapening of paper has been one of the foremost agencies in the progress of the 19th century.

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A CORRESPONDENT writing to the *Times* says:—"The peasant who lives on his own land, drinks the milk from his own cow, eats the eggs from his own poultry, and pays for his bread, meat, clothes, and other charges with the surplus produce of his own labour and holding, is the pattern proprietor of the day. This picture of rural life is most attractive, and the only question is, can it be realized on ordinary commercial principles? It is assumed by the platform speakers who go forth from the large towns that the great landowners, aided by the land laws, have smothered the growth of such a proprietary class. Far from it, they desire to see such communities flourishing around them; but hitherto the progress and customs of agriculture in England have naturally led to a different result. Sir J. Caird has proved irrefutably that the small proprietor in this country fails on economical principles, for he produces a less outcome per acre than the large farmer. Still, that is no reason why such a class should not subsist, on the principle of 'the greater happiness to the greater number,' provided that the system be self-supporting. Now is the time for founding such settlements. But Messrs. Chamberlain and Collings are not justified in trying the experiment as they propose, by advances at the cost of the British tax-payer, with no security which can be realized if it fails. Large tracts of cultivated land, with all the improvements of buildings, enclosures, drainage, &c., which the money of the owners has added to them, can now be easily obtained at a less price than has been known during this century, and Lord Cairns's Act has freed settled estates for the purposes of sale. Capital, the root of every enterprise, must be advanced. Let these capitalists form a company, call it the Liberal Land Loan, or Peasant Proprietary Company, or any other characteristic and attractive name, purchase extensive districts, sub-divide and allot them in suitable plots, and sell them to the would-be cultivators on payment of part of the purchase-money, with the remainder on mortgage. In all these schemes the plot appears to rank as an indivisible unit, whereas the death or failure of the proprietor necessarily tends to sale or sub-division, unless it be counteracted by a settlement on the footing of primogeniture, or some other exploded device. If it be desired to introduce an element of philanthropy into the undertaking, the promoters might, out of their own pockets, pay the cost of obtaining on indefeasible title under Lord Westbury's Act, which would legalize any sub-division or transfer of the plots by a simple entry in the register, and they might at the same time limit themselves to a rate of 5 per cent interest after the manner of the Artizans' Dwellings and other like companies.

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"Why then, do advanced Liberals call for State aid, which is the exact equivalent of the bounty granted by the Governments of France and Germany to the native growers of beet-root sugar? Surely this is a doctrine which must be abhorrent to the President of the Board of Trade. I may add that, as Mr. Chamberlain is apparently anxious to obtain some knowledge on the subject of his pet project, he might usefully inquire into the working and fate of a peasant colony which his prototype, Mr. Fergus O'Conner, the Chartist, established within living memory. The French peasant is invariably quoted as the standard example for imitation. I have had an opportunity of watching his condition during my residence in a depertment where many cows were kept. There his house was bare, with an earthen floor, without any conveniences, save well-made closed bedsteads in the same room, and a good *armoire*. The cows were kept in sheds tied to stakes without crib or manger, on an earthen floor, without litter; armfuls of green clover in summer and hay in winter were thrown on the dirty ground before them for their food: still, the women made most excellent butter in consequence of the labour and care bestowed in pressing out the buttermilk. The soil was a rich sandy loam, and the climate superior to that of England, but the cultivation was very primitive, and the land so foul that the cattle were turned in to feed down the weeds after harvest; the beet grown for the cows was almost entirely leaf with very little tuber, and the total produce per acre of all crops much below the average of arable in England. The staple food of the people was black bread made from buckwheat. No English labourer would bring himself down to the hard life and dirty home of the French peasant proprietor. The only member of this class who appeared to do well was the artisan who cultivated his plot when not at work at his trade.

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"All these social problems cannot be solved by theory alone, but must be tested by facts. I will give the counterpart of rural life which lies under my eyes in England. It is said that the English peasant cannot rise from the ranks There are now residing in a parish of some 1,200 acres close to my home the best grass farmer of the district, formerly, I believe, a carter, who married the dairymaid; he now rents a farm of nearly 200 acres and his two sons occupy similar holdings in adjoining villages; another, renting farmer and dealer, worked when a lad, under the gardener in the squire's garden; a third, very recently a farm labourer, now rents a small dairy farm; a fourth, who started in life with £50 in his pocket, became a renting farmer, and has now retired to a house of his own, and is succeeded in the farm by his son in this same village. I could cite many other instances of success in the neighbourhood, but none from the class who have aped the habits of the gentry, whose daughters play the piano, and contemptuously decline, as they phrase it, "to marry a cheese or a butter tub." It may be asked why more of these renting farmers, many of whom are also small proprietors, do not rise on their own property. They have found it hitherto more profitable either to sell or let their land and invest their capital in farming business; hence the general tendency has been for the land to concentrate in the ownership of capitalists rather than to remain in the possession of the small proprietors in those districts where they previously existed. This accumulation of land in the hands of the few is the direct consequence of economical principles and trade instincts rather than of social change, and is predominant in Great Britain. Frenchmen and Irishmen move on different social lines. The political farmer may cultivate proprietary exotics with some hope of success on his own private forcing grounds; but I ask whether it be possible to cut up the land, and alter the habits, customs, and occupations of the great bulk of the rural population by legislative measures, however arbitrary, even though baited with the flesh hooks of confiscation."

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The following communication from Mr. A. K. Connell to a home contemporary will be read with great interest:—"With your permission, I should like to supplement the figures, recently given in the *Times*, as regards the American and Canadian wheat trade, by those of the Indian wheat trade. The Indian Government has issued various interesting reports as regards the cost of growing wheat in India, but that most recently drawn up by Mr. W. C. Benett, Director of the Agricultural Department of the North-West Provinces and Oude, is of the greatest importance. The provinces contain the best wheat land in the whole of India and the area under wheat has increased more rapidly in that part of India than in any other. The statistics given are generally applicable to the rest of India, except, perhaps, the Central Provinces, where the farms are larger, rents are lower, and the pasturage is more extensive. According to Mr. Benett, the cost of raising a bushel of wheat is about 1 rupee 3 annas, while the selling price, at a time when exports are large, is about 1 rupee 8 annas. Rather more than one-third of the cost is paid in cash, the rest is paid in kind to the labourers, or goes to support the cultivator and his family. The average yield on the dry land is 12 bushels, and on irrigated land 22 bushels of grain and 1 ton of straw per acre, the average size of farm being five acres, but sometimes the out-turn is as high as 33 bushels an acre. The conclusion to which Mr. Benett comes, writing last July, when prices were fairly high in the foreign market, is that, when the profits of the corn dealer and the expense of bringing wheat to market are taken into account, it is not probable that the cultivator (at 40lb. for the rupee) recovers more than the value of his labour and interest on his capital expenditure on cattle and implements. If this estimate is correct as regards the most fertile districts of India, it is not probable that a higher profit is realized elsewhere, except where there is a sparse population on a good soil, and the surplus left, after feeding the cultivators and labourers, is much greater than in Northern India.

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"The next point is the cost of transport from up-country districts to the sea-board. The distance by rail varies from about 900 to 300 miles, and the charge for equal distances varies on the different lines. From Delhi to Bombay (890 miles) the charge last summer was 6*s*. 6*d*. a quarter of wheat, Fyzabad to Calcutta (598 miles) 5*s*. 2*d*. a quarter, whereas the Great Indian Peninsula line charged not [illegible] since, for a distance of 616 miles, 6*s*. 8*d*. per quarter From Lahore to Kurrachee the charge was in 1883 about the same as from Delhi to Bombay, but, since the reduction of the charges on the Rajpootana line, it is rather more. The lowest charges in India are on the East Indian line, and were last July, according to Mr. Benett, one-eighth of a pie (one-eighth of a penny) per maund per mile, compared with one-seventh of a pie per maund (80lb.) on American wheat carrying lines. Freights from India to England were last summer, after the Indian wheat harvests, about 7*s*. 9*d*. per quarter from Calcutta, and 6*s*. 8*d*. from Bombay, and rather higher from Kurrachee. Putting the incidental charges at three to four shillings a quarter at the least, it is clear that wheat cannot be laid down in London at the present price with any profit to the Indian grower, and if the wheat trade continues without the price rising it must be supposed that the profits, if any, go to the

Indian middleman, owing to the difference between the buying and selling price, or to the Indian Government in taxes and rent.

"How very small the margin of profit must be even to the middleman, when he buys at the cheap rate current at harvest time, is clear from the fact that during the last year the Indian wheat trade has suddenly shrunk by 17½ per cent at Bombay and Kurrachee, while at Calcutta it has not been one-third of what it was in 1883. And it must be remembered, as I have before pointed out in the columns of the *Times*, that, owing to the system of State loans and guarantees for railways, there is a serious set-off against any profits to the Indian grower by reason of the interest charges which he has had to pay in the past, to the amount of many millions, for all the wheat lines, and which he has *still* to pay for four of them—*viz.*, the Oude and Rohilkund, the Scinde, Punjab, and Delhi, the Indus Valley, and the Northern Punjab. None of these railways pay their interest charges, and the deficit on the Indus Valley and Scinde and Delhi lines alone amounts to about £400,000. As on those two lines wheat forms one-third of the goods traffic, and, since they have been open, the price of wheat has risen only about 15 per cent, the gain to the agriculturist on the price of wheat has to be set against the loss in the bounty paid out of taxation to the railways. A declared freetrader like Lord Ripon appears to ignore this fact in his speech. There is reason to doubt whether the net result is in the grower's favour, even when prices are high; but if they fall, the net loss by reason of the grant-in-aid to the railways is undeniable though it may be borne only in part by the Punjabi. These railways were, of course, built with a special eye to military purposes, and so far must not be judged from a commercial point of view, but regarded from the standpoint of the economist, they ought to make us hesitate before asking the Indian Government, as Mr. George Potter does, to build more wheat-carrying lines, which may bring a heavy burden on the Indian taxpayer, and artificially stimulate the competition of India and America for the foreign wheat market. For India, as a whole, it is better to store its surplus corn crops, or distribute them in India, than to be encouraged by bounties to export them, and for the purpose of distribution, metalled cross-country roads are wanted sadly in most districts. Does not the teaching of Adam Smith (Bk i., chapter xi), on the evil effects of bounties "in hindering the abundance of one year from compensating the scarcity of another," apply with equal force to grants-in-aid to the carrying trade of a country? Is it fair to the Indian townsman to raise prices, is it fair to the English farmer to lower them, by this disguised system of protection? This is the question which ought to be discussed."

LAND REVENUE IN BURMAH.

An important correspondence has lately passed between the Government of India and the Chief Commissioner of British Burmah, on the subject of postponing the land revenue instalments in that province. From the papers published, it appears that rice is reaped in the Pegu and Salween deltas one to three weeks later than it is in the upper districts, Henzada and Prome, or in the Akyab district. In those tracts where the reaping and harvesting is latest, the cutting of rice is finished by the 20th of January, and in another three or four weeks, they are all sent to the rice mills at the sea-ports. Under the rules in force at present, the 15th of February is the fixed date on which the land revenue falls due. Unlike Bengal, the entire amount of revenue is payable in one instalment except a very small portion called the 'kaing' that is, the Government demand on spring cultivation, which falls due on the 1st of April. Looking at the time when the harvest is gathered, and that on which the instalment falls due, it is quite apparent that the cultivators have little time to dispose of to advantage what has been reaped only a few days previously. The Settlement officers, taking these facts into consideration recommend that the 15th March, instead of the 15th February, be fixed as the date on which the land revenue shall be due. We might as well premise here that in former years, from one-third to half the land revenue was not actually collected till the middle of March, and there was no rigid law in regard to collection. Last year, however, special effort was made to get in the revenue quickly, and the arrears due on the 30th day of March was from 15 to 20 lakhs less than in former years. About three years ago, the opinion of Burmah revenue officers was taken, which showed that there was no need for changing the date for payment of land revenue on rice land, and the Chief Commissioner himself sees no reason for change, although he cannot but admit that it would be a positive gain to the majority of rice cultivators. Now, rice occupies nine-tenths of all the cultivated land in the province. The postponement will enable the landholders who cultivate with their own appliances and means, to keep their paddy out of the market during the early portion of the season when, as a matter of course, prices are low. They can thus abide their own time, and dictate their own terms a little later on. But what effect will this measure have upon the interests of mill-owners, who expect paddy to come pouring in, in large quantities, by the 25th of February. It will certainly interfere with any forward arrangements they might have entered into in the matter of exporting rice to other countries. But, on the other hand, there are many landholders who have to hire both labour and capital, and the demand for money to pay for these is heavier than the demand for money to pay the revenue, and they would naturally dispose of their stock at the current price, instead of waiting for a rise in the market, and consequently, the postponement of the revenue demand till the 15th of March might not cause any very great diminution of the supply of paddy to the rice mills during February and March. Should, however, the owners of these mills have chartered freight forward for the beginning of the season, a year's notice is sufficient to prepare them for the event, if it is decided upon. The postponement of the date for beginning collections from the 15th February to the 15th March, will mean that from 30 to 50 lakhs of Burmah land revenue will be collected after the last day in March instead of before that date. The Chief Commissioner says:—

> The financial ways and means of the Empire for that official year will be affected to that amount, and the financial ways and means of the province will be affected to one-third of that amount. The Chief Commissioner is not aware whether the Government of India can afford to lose this sum in any one year. Apparently, the loss could not be accepted in the current year, as the budget estimates were framed on the expectation that the whole revenue of the year would be realized. But if the Government of India were pleased to frame the estimates for 1885-86 so as to admit of a loss of from 30 to 50 lakhs (say 40 lakhs as a mean) of Burmah land revenue in that year, then the Chief Commissioner advises that the postponement of the land revenue date be carried out. He believes that such postponement would be a benefit and convenience to the people.

The Government of India were at first disposed to limit the postponement of the date of payment to the districts or parts of districts where the greatest inconvenience is caused by the maintenance of the existing date; but as the season was then so far advanced that any order for postponing land revenue instalments would not reach revenue officers in circles until the arrangements for collection were in actual progress, the orders were countermanded and the introduction of the scheme for the postponement of the dates of payment of 15 lakhs of land revenue in certain districts was deferred until the year 1886-87.

THE COAL QUESTION.

Had proper enterprise but been shewn in extending the Railway system upon a well-considered general plan, we should by this time have had such a net-work of lines as would have not only completed the military system, but have equalised the agricultural produce of the country, by rendering the surplus crops of one district available to fill up the deficient crop in another, which can only be done when the rate, or cost of transport, will admit of its being sold at a very small increase upon the average price of local produce. At present, the most abundant crop of rice or any other food grain, if it be grown twenty miles off a line of railway or water carriage, is practically useless as an equaliser for a deficiency elsewhere, as the expense of cartage to and from the place of debarkation increases its value to an almost prohibitive price for the mass of the ryots & other consumers who, having lost a large portion of their own crops, are the less able to pay the exorbitant price demanded for its imported substitute.

Railway companies, as a rule, are very willing to meet the public half-way in any question of reduction of freight, but complain of the high prices they are obliged to pay for coal. Of course imported coal cannot be sold under a certain price, but what we complain of is, that the indigenous resources of the conutry are utterly neglected, although the attention of the Government has been called to the fact, not only in these columns, but in the columns of every leading paper in the empire. Take, for instance, the millions of tons of the best steam coal in India which are lying *in situ* in the state of Rowah, peacefully reposing, undisturbed by pick or shovel, whilst the Railway Companies are starved for want of that very fuel, which is to them so near, and yet so far. We know that a railway connecting the mines with the East Indian Railway at Kutni, forty miles distant, is being made, and we hear it is being pushed on, in accordance with the Secretary of State's order, dated August 1884; but how do we stand with regard to the coal mines? Why are they not being utilized? A Colonel of Engineers, who has made the supply and demand of Indian coal an official study, visited them last October in company with the gentleman in charge of them. He was much pleased with what he saw, and recognised at once the enormous value, both geographically and economically, of the Rewah coal fields which, if properly worked, will raise 300,000 tons of coal annually for the supply of the Central Indian and Western India railway systems, which coal can be sold at the pit's mouth, or at Kutni, at from 3 to 3½ rupees per ton against 13 to 15 rupees per ton, which is the present price of Raneegunge, or imported coal at Kutni. The Colonel recommended in his report that a scheme should be drawn up without delay for their efficient working, and the necessary steps taken for their fullest development with as little delay as possible. Unfortunately for the carrying out of the scheme, that officer went on leave, and has not since returned. The Director of the Mines was called to Calcutta at the end of last December, and in obedience to orders, submitted an ably drawn working scheme which had been carefully prepared by professional men, to whom coal-mining and all belonging to it was second nature; it had been framed upon the intention of giving full effect to the importance and capabilities of the mines, and raising every ton of coal that could find a ready sale. This scheme had to run the gauntlet of five Colonels of Royal Engineers and a departmental member of Council, before it could be adopted. Four of the R. Es. assented and approved of the scheme, but the fifth negatived the whole plan, and the member of Council following suit, nothing was done beyond appointing the heads of the staff. No arrangements for machinery are being made, and no labor department is being organised; and as these are the essentials of a working colliery, it goes without saying that the mines are not being worked, and never can be worked under the half-developed system at present enforced by those who are answerable for the arrangements.

The fatal error in the Government scheme is ignoring the necessity for a special labor department. There is no surplus of mining labor in India, because underground work is generally disliked by the Indian laboring class who never take to it except for a *quid pro quo*, considerably above the daily wages earned, and the most successful and effective one has been found to be the settling himself and his family comfortably, with a small plot of garden ground, in villages belonging to the colliery, and protecting them from the excesses of themselves and their evil advisers. Colliery managers never train more hands than they require, or house and settle miners for whom they have no work, *ergo*, there is no available mining labor which can be hired for any new undertaking; each and every industry requiring skilled labor must train it for itself. Underground coal-cutting is a speciality often requiring both firmness and strictness on the part of the managers. Orders have to be given and obeyed which a half-trained miner may think harsh, unnecessary, or both, and in a moment of unreasoning anger he will make up his mind to run away, and he does run away unless you have a little anchor on him, and the simplest and least irksome is a proprietory right over his house and belongings. It may be taken as a mining axiom that the miner over whom you have no domestic control is not worth the trouble of training, as he will run away from an imaginary grievance quite as soon as from a real one, and, like a wayward child, skulk in the jungle, without having the manliness to come back.

These little technicalities Members of Council and Royal Engineers are not expected to know; such knowledge comes not intuitively, but is the result of years of patient industry and quiet observation; but it is much to be regretted that when information so laboriously gained is placed at the disposal of heads of departments, it is not accepted in the same spirit as that in which it is offered. Government commercial transactions are generally very costly failures, because there are no responsible heads. Colonels of Engineers, and such like amateurs, never spend money at the right time; they spend three times as much money in the long run as any professional or private company would have done, but two-thirds of it is the cost of rectifying their own early mistakes, which they have blindly or obstinately drifted into by pursuing a course that must lead to ruin; but by the time it arrives, the authors of it have left that work, and perhaps the country, and their successors point with pride to the failure of their predecessor, proclaiming their own innocence, and then begins another reign of irresponsibility, and so on *ad infinitum*. The frigid policy now in favor regarding the Rewah coal fields, the hanging back from raising coal in anything like the requirements of the Railway Companies, or the capabilities of the coal deposits, is due to two causes. One is to save the Government collieries of Warrora and Mohpani from certain loss, if not extinction, which can only be done by keeping Rewah coal at the bottom of the pit; and the other is to help the small Bengal Coal proprietors to keep their shares at a fictitious value, by making it a case of Hobson's choice. Give the Railway Companies a choice between Rewah and Bengal, and Bengal coal shares will fall somewhat in value, and this is a good and valid reason for shareholders to try and keep Rewah coal out of the market; but it is not a sufficient reason for the Government to aid them at the expense of the Railway Companies, who are now spending lakhs of rupees annually on coal account which is entirely unnecessary, and would be better employed in reducing freights, equalising the agricultural produce of the country, and feeding the hungry in the less favored districts, where the food crops have partially failed.

Miscellaneous Items.

THERE has been another heavy fall of snow on the Murree hills. The road to the Gullies is so blocked up as to be indistinguishable.

THE Neriad Agricultural Exhibition was opened lately by the President, Mr. Spry, in the presence of a large assemblage of people.

THE French barque *d'Artagnan*, Captain Palvadau, anchored in the Pondicherry roads on Friday last, having on board 150 returned contract coolies shipped from St. Denis, Reunion.

MR. J. C. MCDONNELL, Deputy Conservator of Forests, of the 2nd grade in the Punjab, has been appointed to officiate in the first grade of Deputy Conservators, with effect from the 31st January 1885, or until further orders.

THE right to sell opium and intoxicating drugs within Madras municipal limits, during the year 1885 86, was put up by the Collector to auction, at the Custom House, last week, and was bought by a single bidder, a Mahomedan, named Shalum Khan, for Rs. 17,000. Last year the sale produced Rs. 20,020.

WE understand that a company is being started in Poona for the purpose of manufacturing manure by a chemical process, recently patented by Professor Samuel Cooke, of the College of Science. We have every reason to believe that this new manufacture will prove of great benefit to the class for whom it is intended. New industries are just what are wanted, to relieve the depression of the present time.

THE Mixed Committee, composed of the British and Portuguese Commissioners sitting at Goa, have concluded their labours regarding the salt question. The result has not yet transpired, but with respect to the increase of the abkari tax, the British side has carried its point. The tax will be increased to Rs. 4 at Goa, and to Rs. 5 at Damaun and Diu. The Committee are proceeding to Goa and Diu to settle the question of salt.

MR. JAMES MORRIS, architect of Hummum-street, Bombay, has filed a patent for "fire-proof and sound-proof flooring suitable for business premises and public buildings, dwelling houses, open terraces, and native chawls." Mr. Samuel Cook, Professor of Chemistry and Geology, at the Poona College of Science, has registered a patent for the manufacture of chemical manures from materials locally obtainable in the raw condition.

THE surplus irrigation last year amounted to Rs. 25,73,133, after deducting the charges for maintenance and interest on outlay for productive public works. This is an advance of nearly 7¾ lakhs on the surplus for 1882-83, resulting from a large increase in the gross income, and only a small additional expenditure. The area irrigated was 323,490 acres more than in the previous year. The season was particularly favourable to the development of irrigation owing to a scanty rainfall.

FROM the accounts of the trade and navigation of British India for the first ten months of the current financial year, as compared with those for the corresponding period of the last year, we see that the value of merchandise imported was Rs. 46,71,61,433, as against Rs. 46,37 95,594, and that of merchandise exported Rs 66,73,77,919, as against Rs. 71,77,87,959. The value of treasure imported was Rs. 11,79,32,897, as against Rs 9,94,30,446, and the value of treasure exported was Rs. 1,67 15,628, as against Rs. 87,38,964. The gross amount of import duty collected was Rs. 1,95,18,768, as against Rs. 1,84,03,559, whilst the amount of export duty collected was Rs. 35,40,234, as against Rs. 47,15,576.

THE scarcity of water at Bangalore has now become so great that the General commanding has issued an order, warning all persons to exercise the strictest economy in their use of it, and fixing the maximum quantity to be allowed each barrack per diem. Thus it appears that the Royal Horse Artillery at the Ulsur Barracks are allowed 6,000 gallons a day, the Cavalry and Field Batteries at the Agram Barracks 21,000 gallons, and the Infantry and Bakery 11,000 gallons. What the allowance will be reduced to before the rains begin, it is difficult to say.

THE establishment of the Bombay Oil Manufacturing Company bids fair to meet the increasing demand for cocoanut and other oils which is felt in our midst by railway companies and cotton mills. Hitherto this demand was met by imports of oils from Cochin and the Malabar Coast. The new company has shown that it can supply oils of all kinds much more cheaply, and of a superior quality. The Company has already gained the confidence of many of the Bombay mill-owners The oils have been tried by Messrs. Kemp and Co., Treacher and Co., and Deputy Surgeon-General Dymock, who have testified to their excellence. We wish Messrs. Jugmohundas and Shapurjee—the promoters of the new industry—every success. There is a vast scope for the Company in this new line of industry in Bombay.

OTHER devices having apparently failed, the New Zealand Government has been seeking to combat the rabbit plague by the importation of a large number of weasels and stoats from England. We read that a third consignment of 158 of these animals were recently despatched to the Colony from London. They were obtained chiefly in Lincolnshire, at an average cost of five shillings a head. Special arrangements had, of course, to be made for the transport of the novel freight to the Colony, and it seems that the weasels and stoats were confined during the voyage, in trios, in zinc-lined boxes, and that a consignment of 2,430 pigeons was carried on board for their food. The New Zealand Government appears to be in great straits over the rabbit question. A year ago, it may be remembered, the colonists asked the aid of the Government of India in their difficulties, requesting a consignment of mongooses from this country. The mongooses were, we believe, in due course, sent, but have, seemingly, been as unsuccessful as were the gins and traps which had already proved unavailing.

Selections.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary General Meeting was held on Wednesday, the 25th February 1885.

W. H. COGSWELL, ESQ., *President, in the Chair.*

COMMUNICATIONS.

From C. H. Vowell, Esq., C.S., Collector of Patna, applying for instructions for sowing Carolina Paddy—supplied.

Dr. E. Bonavia, Etawah, referring to Mr. S. H. Robinson's Prize Essay on the Sugar Date (published in Vol X of this Society's Journal,) and the figures therein given of the production of sugar in Bengal, enquiring whether the outturn has decreased, and if statistics are available regarding the amount of Date Sugar manufactured. Dr. Bonavia was informed that as far as statistics are available, no decrease is shewn in the production of Date Sugar; according to the Bengal Administration Report for 1883-84, the export of sugar rose 86 per cent in the year it reviews, "and would, it is said, have been still larger, but for the competition in the English market of Beet Sugar imported from Germany." There is no distinction made in the statistical returns of goods exported to foreign countries from Bengal, but the figures given of exports are:—*Drained sugar*, Maunds 3,06,057, and *Undrained sugar*, Maunds 88,601.

The only direct reference to the production of Date Sugar is in the Bengal report for 1882-83, where it remarks that its cultivation and manufacture are extensively carried on in the districts of Fureedpore, Bhagulpore and Jessore, in parts of Nuddea, the 24-Pergunnahs and Khoolna, and that in the Bhagulpore district the annual outturn of *goor* is estimated at maunds 1,15,000. In Jessore there were, it is stated, 24,122 acres under Date cultivation in 1882-83, and the outturn of coarse sugar was 10,056 tons, the value of sugar, refined and coarse for that district during the year was Rs. 27,72,599 for sugar (*cheenee*), and Rs. 20,73,642 for coarse sugar (*goor*), or the considerable sum total of Rs. 48,46,241 for the one district.

From the Librarian, Public Library, Museum, and National Gallery, Victoria, forwarding Baron Von Mueller's Eucalyptographia Decade X, presented to the Society by the Hon'ble the Premier at the Baron's request, a vote of thanks was accorded for this valuable work.

From Major A. Talbot, Bikanir, Rajpootana, reporting the success of some of the Lawn grass seed imported from Australia. In reference to the Tricholœna Rosea, which was described as being specially suited to dry sandy localities, and the seed of which the Society procured from Natal last year, Major Talbot remarks:—"The Tricholœna Rosea has not done very well. Of some seed sown in Sandy soil and not irrigated, none came up; of other seed sown also in sandy soil, but regularly irrigated, a few plants only came up. It appears to grow in small distinct clumps, and not to spread over the surface of the ground to any distance, but as those few plants have seeded themselves, possibly the grass may spread more this year. I doubt of its fulfilling the expectations formed of its utility for fodder, from its slow and uncertain growth in a soil supposed to be peculiarly well suited to it.

"The Reana Luxurians has done better, and though from the poverty of the soil it is not luxuriant as it is said to be elsewhere, I have a number of healthy plants, they have suffered from the cold, but will soon start into growth again. These plants have been irrigated twice a week, with a larger supply of water they would probably be finer plants than they are; when well established they seem able to defy white ants, but while still young, many of them are eaten."

From the Dewan Lakhpat Ray, of Kashmir, forwarding a note on vine culture in Kashmir, which has been transferred to the Journal, and advising the despatch of a basket of grafts of Apples, Pears and Cherries. As the Society was unable to utilize them, having no stocks, the presentation was transferred to Dr. King for experiment at Darjeeling. The Dewan, when visiting Calcutta lately, called at the Society's office and expressed the interest he took in the improvement of Agriculture in Kashmir, and his readiness to experiment with any seeds or plants the Society might wish ried, or acclimated by culture there.

From Captain F. Pogson, forwarding for examination and report a rope made from the bark of the *Maul Dhun* creeper, which grows abundantly and to a considerable size in the forest. The rope is very strong and is used for tethering cattle, the leaves are used by the *Bunnias* and *Halwais* for packing purposes, and are large and tough. Captain Pogson goes on: "it appears to me, that under culture the young bark would be of considerable value for numerous purposes, including the manufacture of sacking and canvas, while the refuse would answer very well for paper." The plant has been identified as the Bauhinia Vahlii, well known for the strength of its fibrous bark, ropes constructed of which are used in suspension bridges by the natives. Captain Pogson has been asked to obtain some of the seed for the Society.

Captain Pogson promises some further information regarding a sorghum cultivated in Hurriana, which has been grown there for years by the Zemindars in place of sugarcane, it is called "Alapour Joar," and the fact of its being thus cultivated is in itself the best certificate of its usefulness.

INSECT PEST.

From R. Cornish, Esq., C.S., Officiating Collector of Midnapore, forwarding a packet of a plant infected with the larvæ of some insect, which is said to be injuriously affecting the crops; he enquires what they are and what remedy may be suggested. The specimens were forwarded to Mr. Wood-Mason, whose reply is given in full; as, by attending to his valuable suggestions, correspondents sending insects for identification or report would ensure their arriving in good order.

"From such a dried and bruised specimen as that which you submitted to me yesterday, it is not possible to ascertain the nature of the lesions, if any, from which the plants have suffered. I have carefully examined all the *débris*, and amongst the several species of insects which this contains, I have found the dried and shrivelled bodies of a species of plant-louse (Aphis) in considerable numbers. I have also found a few of the same species in the interstices of the pith. It is possible that the attacks of these insects may have caused the inanition of the seed capsules, which is to be observed in the specimen. But it is, to say the least, doubtful whether the condition of the plant is due to insect agency at all. References of this nature should be accompanied by a description of the nature of the disease or of the injuries from which the plants are suffering, and by spirit specimens, both of the supposed pests and of the injured leaves, or other parts of the plants."

ANNUAL FLOWER SHOW.

The Annual Flower Show was held on the 6th February, and was marred by the stormy unsettled weather we were then experiencing. The night before the Show, when all the plants were in position on the stages, and all arrangements were completed, a sudden and sharp storm blew down all the tents, with the exception of two corner ones and one of the shamianas kindly lent by H. H. the Lieutenant-Governor. A great deal of damage was done to several valuable plants, but, on the whole, considerably less than might have been expected after such a mishap. Probably Baboo S. P. Chatterjee was the greatest loser, one or two of his most valuable plants being irretrievably ruined. It was for some time probable that the Show would have to be postponed, but it was finally resolved to carry it through though it was with considerable difficulty that the tents were re-erected and the plants re-arranged before the Judges went round, and some minor details had to be neglected as the whole staff were engaged in repairing the damage caused by the storm, in the garden itself as well as in the Exhibition.

The re-writing the names of the plants where they had been destroyed, preparing cards with names of Exhibitors, and some other less important matters, had to be passed over. By the time visitors were admitted most of the damage had been repaired, and had the afternoon been fine, the Show would have been as successful as any of the preceding ones. Notwithstanding the threatening weather, which finally turned to rain, before the afternoon was over, her Excellency the Countess of Dufferin accompanied by Lady Helen Blackwood and Sir James and Lady Ferguson, as well as H. H. the Lieutenant-Governor, Lady Rivers Thompson, and the Misses Thompson, visited the Show; owing to the unavoidable absence of the President, they were received by Messrs. G. L. Kemp, D. Cruickshank, H. J. Leitch and J. Martin, Vice-Presidents, and Dr. G. King, Raja Suttyanundo Ghosal, Bahadoor, Mr. Piggott, and Baboo Protapa Chundra Ghosa, and conducted round the Exhibition.

H. H. the Maharaja of Cooch Behar kindly lent his band.

The collection of plants exhibited showed an improvement as to quality over preceding years. The collection of Begonias, Coleus, and Ferns were exceedingly fine, and there was as usual a good display of Crotons, and it is worthy of note that some of them had been grown under glass, which marks a step in amateur horticulture in Calcutta.

The Cut flower section had a smaller number of exhibitors than would have been the case, but for the rain and hail on the previous night; most of these shown were cut the evening before, and the Camellias and Roses were very fine for Bengal. A large number of *malis* exhibited vegetables, which were not especially good, and contrasted very unfavorably with the splendid collection exhibited by Mr. Maries, of the Durbhunga Raj Garden, who generously did not compete; Mr. W. Stalkartt, of Goosery, too, sent some fine vegetables from his Garden at Goosery, the tomatoes were particularly fine, as also were the Potatoes exhibited by Mr. J. Stalkartt, of Hope Town, Darjeeling; as these gentlemen did not compete, the thanks of the Society are the more due to them for their public spirit in exhibiting and sending their vegetables such great distances. Mr. Maries' having come from Durbhunga, and Mr. J. Stalkartt's from Darjeeling. If these good examples were followed by other gentlemen in the Mofussil, a class might be made in which they might compete with each other. The fruit of the Paudanus appears to have attracted some attention, as it was not recognised by the majority of the visitors. It forms an article of diet in the Nicobars and elsewhere, the fruit being reduced to a powder; the process has been detailed in this Society's Journal.

The Royal Botanic Garden as usual contributed, as in previous years, a choice and interesting collection of plants for Exhibition only.

The Grant Silver Medal was awarded to S. P. Chatterjee, of the Victoria Nursery. The collection included some rare plants, and was arranged with much taste and skill, which reflected great credit on the exhibitor, when it is taken into consideration that the Shamiana in which the plants were placed, had in its fall caused considerable damage to several plants which had to be replaced within a very limited period of time.

In all Rs. 732 were awarded for prizes, according to the schedule. Some classes not having been filled, the extra sum at the disposal of the Judges was given for plants or vegetables not included in the list.

Out of the sum of Rs. 100 placed at the disposal of the Committee by the President, for plants either rare, well-grown, or not included in the Schedule, Rs. 85 was expended.

INTERCHANGE WITH COLONIES.

From C. S. Bailey, Esq., C.S., Officiating Under-Secretary to the Government of India, forwarding the following extract from the Principal Under-Secretary's Colonial Office, Sydney, letter to the Secretary to the Government of India:—"I have the honor to request that you will kindly convey to the Agricultural and Horticultural Society of India, the thanks of this Government for the seeds presented by them to the representatives of the Colony at the Calcutta Exhibition."

A case of fruit grafts has, at the suggestion of Mr. Stewart, the Emigration Agent for Fiji, been forwarded by the *Main*, which left on the 18th instant for that Colony, and an interchange, which has proved of interest in previous years, resumed.

RICHARD BLECHYNDEN, JUNIOR,
Deputy Secretary.

PEPPER VINE.

COLONEL E. B. SLADEN, Commissioner of Aracan, has very courteously placed at our disposal the following report from Captain C. A. Cresswell, Deputy Commissioner, Sandoway, on the results attending the experimental cultivation of the Pepper Vine, in the neighbourhood of the town of Sandoway. Before making any remarks on the cultivation of the pepper vine and its probable success, it would be as well perhaps, as this is the fourth year of the experiment, to give the actual position as regards number and size of plants as actually counted about the 14th February 1885, and which will be entered as 1884 and compared with those of 1883, counted in March 1884 and entered as 1883.

DODAUNG.

BLOCKS.	Under one Foot.		From one to two Feet.		Over two Feet.	
	1883.	1884.	1883.	1884.	1883.	1884.
Block (1)	565	511	64	12	6	...
Block (2)	1,380	416	42	52	25	58
Block (3)	1,220	811	25	62	5	14
Block (4)	320	604	41	326	16	164
TOTAL ...	3,485	2,342	172	452	52	*236

* Of which 62 were over 4 feet.

KYAUNGDAUNG.

1884.	Under 1 foot.	From 1 to 2 feet.	From 2 to 4 ft.	Above 4 feet.
	183	73	30	229

A great part of the Dodaung cultivation is now, I find, not fitted for the pepper vine. The original acreage taken up was 105 acres. The decrease in the number of plants is due to the fact that in March 1884, over 400 plants were destroyed by fire in Block 2, and further from Blocks 1, 2, and 3. I have now thrown out about forty acres as ground upon which the vine is not likely to succeed. The ground will not be given up but will be simply left to take care of itself; if the young cuttings at present existing struggle up, they can be looked after hereafter. The acreage, as at present looked after by the two gardeners in Dodaung, is 62 acres only, and in April and May I shall again inspect the whole of this ground, and finally decide what is worth keeping up.

Block (4) I intend to devote special attention to, as the ground is good and the trees are doing capitally. I have taken on to Block (4) at the cost of five rupees, an old sugar-cane plantation of over 3 acres, and there I have put down one hundred cuttings of the *Erythrina Indica*, most of which have struck, and will be ready for the young vines to be planted at their feet next June.

This is the method adopted on the Malabar coast, and is, I think, a far better plan than planting the trees in a jungle, where the ground is not of uniform quality, and the vines of course have to be spread over a large area.

By this method (the Malabar plan), about 225 trees can be planted to an acre, and after four years an average crop of one lb. a tree might be expected.

The yield in Sumatra is however very different; there an acre of first class vines will yield from 1,161 pounds of pepper.

In Malabar the average yield from 1,000 plants is only put down as 450 lbs. or less than ½ lb. a tree. From what is actually gathered from trees in Sandoway, I think I am justified in putting down 1 lb. for each tree.

Seven pounds is looked upon in Malabar as a very high yield for one tree. Seven pounds is sometimes realized from the old and uncared for trees round Sandoway.

The price at present here is Rs. 1-12-0 a viss. A valuable product in comparatively small bulk, and one which will bear the expences of transport which paddy rarely does in the Sandoway District.

In Dodaung I expect from 50 to 100 trees to fruit next year, in February 1886. In Kyaung-daung from 200 to 250 in February 1886, or say a total in the two plantations of 300 trees and a produce of say 300 lbs. of pepper, and taking the produce of the year at 8 annas a pound, 150 rupees ought to be realized in March 1886.

The allotment was in—

1882-83 ...	... Rs. 500
1883-84 ...	... ,, 500
1884-85 ...	... ,, 300
1885-86 ...	... ,, 200 (proposed)

For 1885-86 I only propose to keep one gardener, and I propose to limit the expenditure to 200 rupees.

This would give the receipts as 150 rupees on an expenditure of 1,500, rupees or say roughly 10 per cent.

In 1886-87 a far larger yield might be looked for, and the gardens should be not only self-supporting, but should give a surplus over the expenditure for that year.

I do hope that the gardens will be kept up till April 1886, and then Government will be fairly able to form an opinion whether the experiment has been a practical success or not. Of course in an undertaking of this sort I had at first no practical experience.

My first idea was that deep shade was necessary, and that the soil was, comparatively speaking, a secondary consideration.

The first place I fixed upon was Dodaung. This had been frequently worked as taungya, and consequently large shady trees were only to be found here and there. This led to the work being scattered over a large area.

By the second and third year from the undergrowth being cleared away, &c, the trees had sprung up considerably, and more shade was obtained and more trees fit for planting. But still the vines only flourished in certain places, and that was in places where there was the best soil.

Given good soil, shade seems to be an unimportant factor. In Malabar alluvial soil is said to be the best. As I have already said, I think the Malabar method is likely to be the most successful.

Cuttings of *Erythrina Indica* (Penli Kathet) are put down 14 feet apart in the dry weather, and by June next are ready for the pepper vine plants or cuttings. They are all planted in straight lines, and a plantation is easily watched and inspected. In four years the vines begin to fruit and last for 25 years in the case of cuttings; 40 in the case of seedlings.

One of each is usually planted at the foot of each tree. This method of cultivation is somewhat similar to that adopted by the people for the betel vine, so that they will be more likely to take it up.

There is no difficulty attached to the cultivation of the pepper vine. Cattle will not touch it nor even goats. In a healthy state, the vine has few enemies. I have only found two—snails and a long thin brown caterpillar-like grub, with a horny head. Will the people take it up? I think they will; already it is being tried by them in different villages on a small scale, but not on any systematic plan.

I am inducing people to visit the Government Plantations, and see for themselves. People are beginning to talk about it, and from what I can hear, a good many attempts will be made next rains.

As regards Dodaung I have not gone into calculations, nor mentioned the percentage of deaths, and number of plants put down, simply because a great many were planted under conditions which, as we now know, were hopeless. Further, a good deal of ground, *viz.*, about 43 acres, has been thrown out.

In March 1884 there were in four blocks of Dodaung (105 acres) 3,709 plants alive, of which only 52 were over two feet high, and 400 of these were destroyed by fire in May. During the rains of 1884, 1,700 plants were put down in the reduced acreage of 63 acres, and now there are 3,030 plants alive, of which 236 are over two feet high (62 of them are over 4 feet high) I have also put down cuttings of *Erythrina Indica*, of which 100 are alive, and will be planted with vines in June 1885, and before the end of April, I hope to have another hundred down.

KYAUNG-DAUNG.

In March 1884 there were 430 plants alive in this small plantation of 3 acres; 250 plants were put down in the rains of 1884; and in February 1885, 580 were alive, showing a percentage of deaths of cuttings amounting to 33 per cent as against 36 per cent last year.

No record of the height of these trees was made in March 1884; but in February 1885, out of a total of 580, over 289 were more than four feet, and 103 others between one and four feet high. Here the soil is remarkably good; more trees are springing up fit for planting, and next year probably 150 more plants can be put down, bringing up the total to 730 trees, which gives about 243 vines to the acre—rather more than the number per acre on the Malabar method of planting.

Supposing all these vines in fruit, and allowing 1 lb. a tree, those three acres would give a production of 730 lbs. of pepper, worth at least 365 rupees for three acres, or an average of say 120 rupees per acre.

No comparison exists between this and the production of paddy, either as regards labor or profits. To any one, who can afford to wait and work up his ground, fruit trees can be used for growing the pepper vine with just as much success as any other tree, and with the double result of fruit from the tree and the vine.

An easier or more paying cultivation does not exist.

I think Kyaung-daung may be considered a thorough success. It is not as if the fruiting of the vine were doubtful; that is an ascertained fact. From some trees in Sandoway 5 to 7 lbs. of pepper are gathered annually. I have done my best in travelling about the district to explain the advantages, method of culture, &c. As I have already noted, its cultivation is here and there being attempted. On the arrival of the Thugyis with the land Revenue rolls, I took the whole of them to visit the gardens and explained the principal points. A number of the inhabitants of Sandoway have also visited the spot.

Sandoway, with its network of creeks from Sandoway to Mai, wants nothing but a valuable production of this sort to bring it forward from its present backward position. Boat or canoe transport would cheaply bring the pepper to any central point at very little cost, and we might then hope to see a little more trade in the district. If Government should feel inclined to sell or lease Kyaung-daung now that the vines are well established there, I think there would be plenty of applicants. I should then simply continue the experiment on the best part of Dodaung, at the same time testing the Malabar method of planting in straight lines on cuttings of the *Erythrina Indica*.

LIMING.

By Dr. A. P. Aitken,

Chemist to the Highland and Agricultural Society.

The action of lime, whether in diminishing the amount of organic matter in the soil, or in liberating the potash from clays that are rich in that constituent, is clearly in the direction of assisting and hastening the weathering process. When the organic matter is so abundant as to bear an undue proportion to the mineral matter in the soil, and to render the land too retentive of moisture, whereby it does not receive sufficient aeration, and is liable to become sour, the effect of liming is to counteract the sourness, hasten the decay of organic matter,* let in the air, and transform it from a cold and wet soil into a warm and dry one. Trenching and draining accomplish the same end, and in the reclaiming of heath and moss land, liming is employed to supplement these operations.

In the case of retentive clay soils, where draining fails to dry the land sufficiently and disappoints the hopes of the farmer, the action of lime by rendering the clay more porous increases in a marked degree the efficacy of the drains. In the carrying out of these ameliorations, the quantity of lime applied may be very great, and, even from five to ten tons per acre may be found to be productive of great benefit, but there are grave doubts as to the economy of applying lime in such enormous quantity in a single operation. Liming is a laborious process, and it is natural that a farmer should desire to get it done once for all; but there can be no doubt that in most cases where heavy liming is indulged in, there is a great loss of lime from its being run out of the soil in too great quantity. The tendency of lime to pass down through the soil is familiar to all farmers, and while its efficacy in many cases depends upon its permeating and purging the soil, yet it is liable, when too heavily applied to be run off the surface or through the drains before it has sufficiently done its work. While lime remains in the soil there is an upward and downward soaking of lime salts which, especially in the case of clay soils, is of very great importance, and it will seldom occur that one heavy liming is as good as two lighter ones. As a rule, it ought to be the aim of the farmer to keep lime as near the surface as possible, and therefore in ploughing it in, it should not be too deeply buried, and after it has been left for some time, and lost its causticity, the land should be harrowed so that the lime may be intimately mixed with the superficial layer of the soil; and it is evident that if lime is to be kept in the soil, a half liming once in five or six years is better than a whole liming once in ten or twelve.

The remarkable improvement in the physical character of such soils as we have been considering, caused by the addition of lime even when applied in large doses, has doubtless led to the too general and too plentiful use of that substance in agriculture, with the result that many soils have been impoverished thereby. As a rule, ordinary soils, in fair condition, seldom require lime, and when lime is applied too liberally, the apparent benefit resulting from its use is apt to be misinterpreted. It has caused many to suppose that liming has the effect of adding fertility to the soil, whereas we have seen that it is chiefly a means for making the soil yield up its substance more abundantly. The rapid exhaustion which overtakes a soil of average strength when persistently limed is well known, and has given rise to the proverb that "Liming enriches the fathers and impoverishes the sons." There is truth in this as there is in all proverbs, but it is not the whole truth, and we cannot dismiss it with that remark. It is equally true to say that alcohol is a poison, but farmers still continue to use both lime and alcohol, and so long as they use neither in excess, and at the same time take proper means to nourish both their bodies and their land, there is little to fear from the moderate use of either stimulant. Unfortunately, it is too frequently the case that lime is put upon the land in deference to old established custom, and without any precise knowledge of the need of it, much less of the quantities which it is most profitable to employ. As a rule it is a safe practice to follow well-established precedents, but in order that it may be continuously successful, the conditions surrounding it must remain the same. This is by no means the case with agriculture, which during these later years has been rapidly altering its character, so that customs which suited very well the long rotations and restricted cropping of the past, are not equally advantageous when applied to the more intensive agriculture of the present. In the old days, when farmyard dung and vegetable composts were almost the only manures put upon the land, the very large amount of organic matter contained in these substances rendered the application of lime almost a necessity; but at the present time when light manures are so much in vogue, and when the area of arable land is in excess of the proportion which the dung produced on the farm is capable of manuring, the amount of organic matter in the soil may be reduced to such an extent as to lower even seriously the condition of the land. In such circumstances, the application of lime tends to aggravate the evil, and there is no doubt that a blind adherence to the old custom of liming, and especially of heavy liming, has entailed much needless expense, and, in many cases, has been productive of injury rather than benefit to the soil. An ordinary loam, in good condition, contains from 5 to 10 per cent of organic matter, and unless the amount is in excess of that proportion the application of lime is not indicated.

*Of course there are exceptions to this rule, as, for instance, when the loam rests upon a retentive clay, for in such a case it may be of more importance to increase the porosity of the subsoil than to augment the organic matter in the soil itself. There are also cases in which the application of lime is needed as a kind of medical treatment, and this is notably the case with soils affected with 'finger-and-toe.' Recent researches into the nature of this disease have shown that it is correlated with the existence in the soil of a minute organism which feeds upon the roots of turnips and other allied cruciferous plants, such as the charlock or wild mustard; and that it prevails in soils which are too frequently under turnips, or allowed to become foul from the growth of cruciferous weeds. Lime is the only substance that has been found capable of coping with this pest; and where frequent turnip growing is practised, it is found necessary to apply lime on soils which otherwise do not require it. It is a common experience that the application of lime does not always prevent or even diminish the ravages of 'finger-and-toe,' and in some districts the prevalence of this disease, notwithstanding the plentiful use of lime, has compelled farmers to diminish the amount of turnip-growing very considerably.

It cannot be said that such a state of matters is much to be regretted, for the days when turnip-growing formed the basis and backbone of agriculture are rapidly passing away, and the greater attention which is now being paid to the improvement of pasture, the consumption of grain and artificial feeding stuffs, the pulping, chaff-cutting, skilful mixing of fodders, and last, but not least, the making of good ensilage, have contributed to render the farmer comparatively independent of the turnip crop. Desperate efforts to grow a costly and precarious turnip crop on land not naturally suited for it are no longer necessary; but the moderate growth of turnips is still a great advantage, and where good turnip land is infected with 'finger-and-toe,' every effort should be made to counteract the disease rather than abandon the growth of turnips altogether. That lime should sometimes fail to be a sufficient cure may be due to a wrong mode of applying it, and this is a matter which deserves attention. Thus it is found that when lime is immediately applied to the turnip break, it does very little to diminish the disease, but when applied on the oat stubble it does better, and that it rarely fails to check the disease if applied on the lea.

This last method of applying lime has many advantages. It enables the lime to be spread with great uniformity, and in an open season, when there is still growth upon the grass, there is very little loss of nitrates, and when the land is ploughed for oats, the shallow furrow required for that crop prevents the lime from being too deeply buried, so that before the turnip seed is sown the whole surface of the soil has been thoroughly subjected to the action of the lime.

The quality of lime varies very greatly, according to the nature of the limestone from which it is derived. The quantity of actual lime ranges from 40 to 90 per cent, so that not only do some kinds of lime contain half as much real lime as others, but it is usually proved that poor limes contain large quantities of magnesia, and the application of that substance, so far from doing good, may be positively injurious. All limes contain some magnesia, and it is a constant constituent of the ash of plants; but magnesia salts are very little needed in the soil, and may be present in quantity sufficient to constitute a plant poison.

As to the modes of applying lime, there is room for considerable difference of opinion, and, of course, much depends upon the object in view: but for general purposes, the chief thing to be attained is fineness and uniformity. The usual practice of carting the hot lime on the land, and depositing it in little heaps has some disadvantages. The heaps are not equally slaked, and the spots on which they rest are severely burned. To secure equal slaking, they

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Crop and Weather Report.

[FOR THE WEEK ENDING THE 11TH MARCH 1885.]

General Remarks.—There has been slight rain during the week in some districts in the Punjab, the North-Western Provinces and Oudh, the Central Provinces, Bengal, and Assam. Some rain has fallen also in Madura, North Coorg, and Kurrachee.

Harvesting continues in Madras, and, except in Bellary and Auantapore, the standing crops are generally good. In Mysore there is a scarcity of water, both for rice sowings and for cattle. Fodder is also becoming scarce.

The *rabi* harvest is in progress in the Bombay Presidency, in the Central Provinces and in the Berars, and has begun in the North-Western Provinces and Oudh, where it promises well. In the Punjab *rabi* prospects are generally very good. In the Central India and Rajpootana States the crops are in fair condition. In Bengal the *rabi* crops are expected to yield a good outturn. *Boro* paddy promises well; tobacco is being cut, and sugarcane-pressing continues. Ploughing for next season's crops is in progress in some districts. In Assam ploughing operations are well in hand. Sugar-cane is being cut and pressed in the Gauhati and Dibrugurh districts.

The public health is generally good. Prices are as a rule steady, but show an upward tendency in parts of the Punjab.

Madras.—General prospects fair, except in parts of Bellary and Anantapore. Cholera and small-pox prevalent in many districts.

Bombay.—*Rabi* harvest nearly completed in parts of Poona, Satara, and Belgaum; in progress in other districts; standing crops injured by mildew in parts of Nassick and by rust in parts of Shikarpore; scarcity of fodder in 3 talukas of Dharwar, and of drinking water in 5 talukas of Dharwar and one of Kaladgi; cholera and small-pox in parts of nine districts; cattle-disease in parts of 6, and fever in parts of 12 districts.

Bengal.—Slight rain fell in several districts; it has facilitated ploughing operations for next season's crops; harvesting of *rabi* crops continue, and a good outturn is on the whole expected; *boro* paddy is doing well; pressing of sugar-cane is still going on, and tobacco is being cut; price of rice is almost stationary; cholera and small-pox prevail in some districts, otherwise public health good.

N.-W. Provinces and Oudh.—Harvesting has begun; outturn promises well; markets well stocked; prices steady,

Punjab.—Slight rain in some of the districts; health and prospects good; prices rising in Ferozepore, Lahore, Rawul Pindee, and Peshawur, and stationary in other districts.

Central Provinces.—Wheat harvesting is in full swing, linseed having been all reaped; prospects continue favourable; price of wheat in Raipore is now 40 seers per rupee; weather slightly cloudy; days getting warm, mornings and evenings pleasant; crops progressing favourably; health good; prices easy.

British Burmah.—A little cholera in Akyab, Prome, and Thongwa districts; small-pox prevalent in 2 towns, Henzada and Thayetmayo; sporadic in 2 or 3 other quarters; a little cattle-disease in Akyab, Bassein, and Thongwa districts; otherwise health of province satisfactory.

[illegible]am.—Mornings and nights still cold; days becoming perceptibly warm; sugar-cane being cut and pressed; ploughing operations for *aus* in progress, but rain wanted to facilitate ploughing operations; public health good.

Mysore and Coorg—No water in tanks for rice sowing; water and fodder for cattle becoming scarce; public health fair; prices rising slightly in parts. Paddy nearly threshed out; grain light; rain needed for coffee blossom; fall in price of coffee and cardamoms in local markets.

Berar and Hyderabad.—Weather getting hot; *rabi* harvest continues; prospects favourable; wheat 22 and *jowari* 26 seers per rupee.

Central India States.—*Rabi* crops good; opium collection commenced; weather and health good; prices stationary.

Rajpootana.—Opium crop in north-west pergunnas withering up: disease among some crops in one pergunna reported; health good.

Letters to the Editor.

MR. CASAMAJOR ON BROWN COAL AS A DECOLOURIZER.

TO THE EDITOR OF THE SUGAR CANE.

SIR,—In the November number of the *Sugar Cane* is an article by me on experiments with bone-black, vegetable charcoal, brown coal, &c, to show their decolourising effects on solutions of raw sugar.

I write now to say that brown coal has certainly a greater decolourising effect than I had stated. It may also be that by proceeding differently from the method I used, bituminous coal, anthracite, &c., may also give improved results. As to brown coal, there is no doubt that my results were too low. Within a week, Mr. D. M. Service, the agent of the "Sugar Appliances Company" of Glasgow, was two days in my laboratory, to show the decolourising effect of brown coal. He treated two solutions of raw sugar, each with 10 per cent of brown coal. One of these was of Hilo-hilo mats of about 86 co-efficient of purity. The decolouration was equal to 33 per cent. The other sugar was a *muscovado* of 88% cost of production. The decolouration with the latter sugar was equal to 60 per cent.

The only things which Mr. Service did to obtain these improved results, beyond what I had done, were, in the first place, to use moist brown coal, while I used this material dry; and, in the second place, to leave the sugar solution a longer time in contact with the brown coal. The samples of brown coal I had received from Glascau came in paper bags by mail, and the material was consequently dry. The brown coal used by Mr. Service contained, according to his estimate, about 25 per cent of water.

As to the power of brown coal to facilitate filteration, the Hilo-hilo sugar filtered pretty well with 10 per cent of brown coal. Mr. Service thinks that with that particular sugar the filteration would have been better with 15 per cent of brown coal.

As to the muscovado sugar, 7 per cent of brown coal gave an unsatisfactory result, but 10 per cent gave a good cake, with a flow equivalent to 2½ gallons per square foot of filtering surface.

All the solutions passed through very clear. I must also add that the solutions from muscovado sugar were afterwards filtered over bone-black, and that the filtered solutions showed that the one treated with brown coal gave a much better colour than the untreated liquor.

I could not give an opinion as to the value of brown coal as a decolouriser. This depends entirely on the price at which a refiner can actually buy it. As an additional amount of bone-black can always give a decolourising effect equal to that due to treatment by brown coal, every refiner can calculate for himself the comparative cost of using either brown coal or an additional quantity of bone-black.

As to Mr. Service, I will here take the opportunity to congratulate the "Sugar Appliances Company" on their choice of an agent. He is entirely free from the habit of gross exaggeration, too common with persons seeking to introduce new processes. His manner conveys the impression that he is truthful and straightforward, and therefore worthy of confidence.

I hope soon to send you a communication on another subject.

Yours very truly,

P. CASAMAJOR.

New York, December 7, 1884.

Editorial Notes.

VETERINARY art seems to have been practised in India long before the advent of Europeans to the Far East, and it was left for Mr. James Mills, Inspector of Cattle Diseases, Madras, to light upon a curious little treatise on this subject, written in the Tamil language on the leaf of the palmyra or *kadjan*, the original author of which is said to have been a *rishi*, or Hindoo sage, and which Mr. Mills has translated into English. Although the prescriptions given in the quaint pamphlet will not add to our knowledge of veterinary science, some of them are remarkable for the cruel methods adopted by the ancients for the alleviation of pain in dumb animals. We may instance one for the cure of anthrax, or Loodiana disease, which is prevalent throughout India :—" Tie a bundle of straw, light it up, and with it burn the jaw of the animal. Internally, give the following medicine :—Bring a blood sucker and remove its head. After all the blood is passed out of its body, boil it well with varigoo rice, squeeze well by the hand,. and give to the animal a piece about the size of a wood-apple. Keep the animal in the shade, and well covered."

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THE following report has been received regarding the prospects of the wheat crop in Mysore :—" Mysore Durbar supply following approximate statistics—wheat cultivation, acreage 21,740 ; average annual outturn per acre ; 516⅝ lbs. probable outturn per acre 1884, 350 lbs. ; total estimated outturn, 1884, 6,082,720 lbs."

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A FYZABAD correspondent writes :—"The Horticultural Show here was quite a success ; the flowers were delightful. Mr. J. D'Cruz's roses were fine specimens, and his collections of cut-flowers were tastefully arranged ; in many cases the arrangement of cut-flowers was not good, being too crowded and void of foliage. The vegetables were all that could possibly be desired. Monster cabbages, English carrots, peas and turnips, really made one hungry ; whilst the beautiful roots of celery were finer than any we recollect having seen in England. The potatoes and onions exhibited were beautiful specimens. There was a fair collection of fruit. The enormous bunch of plantains exhibited by Moonshee Khadir Buksh called forth general admiration. Garden tools there were none ; we should have liked to have seen some. Mr. Gokulchund, the Municipal President, and Baboo Raghunundun, Honorary Secretary, deserve great credit for the trouble they took to make the show a success. This is the first Exhibition of the sort we have seen in Fyzabad, and if others to follow depend on the success of this one, it will not be the last. The 'management' were a little late in getting their notices round ; otherwise we are informed the exhibits would have been much more numerous. The following is a list of the prize-winners :—

" *Flowers.*—Mr. D'Cruz ; Major Forbes ; Gooptar Park ; Miss Fallen ; Colonel Woodcock ; Major Collum.

" *Vegetables.*—Colonel Woodcock ; Public Garden ; Narain Mali ; Mr. Fox, 100th Regiment ; Major Forbes ; Mr. D'Cruz ; Dyal Mali, N. I, ; Khoob Chund ; Lotoy Mali.

" *Fruits.*—Khoob Chund ; Moonshee Nadir Buksh ; Manick Baboo, 1st quality ; Manick Baboo, 2nd quality ; Colonel Woodcock ; Public Garden ; Pundit Kishen Lal ; Narain Mali; Ramadhi Mali ; Ganesh Morao ; Khanroy ; Ramsaroop Morao."

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THE Liverpool Cotton Association has declined the request of the Calcutta Cotton Trade Association to reduce the Liverpool standard, in consideration of the fact that the Bengal crop has been seriously damaged by the October rains. It is pointed out by the Liverpool Association that the standards are not made from last year's crop, or, indeed from any particular crop, and if altered from time to time, complications of a very serious nature would arise. The standard ranges from " fine " to " middling fair," and in cases like the present, where the crop proves to be inferior in quality, the only safe course for shippers is to sell their cotton on the basis of a lower grade.

ONE of the most interesting subjects with which the last review of the administration of the land revenue department of the Central Provinces deals, is the subject of cattle and cattle-disease. It seems that the lands set apart at the time of settlement as pasture ground for village cattle are diminishing periodically, owing to encroachments, made by cultivators upon the available pasturage. The inroads made by malgoozars and villagers have also attracted the notice of the Deputy Commissioners of several districts, and steps are immediately to be taken to prevent a recurrence of the practice, which ultimately tells on the condition of the cattle in the province as will be shown a little further on. The malgoozars have no right to appropriate to their exclusive use what was devoted for the benefit of a community, and land taken from the *ghotan* has been ordered to be restored to its original purpose in some of the villages. The malgoozars go a step beyond this, and reserve the grass on the village pastures for sale. On this subject the Commissioner of Jubbulpore says :—" The Government reserved waste and forest lands are used also as the principal grazing lands for cattle, the village uncultivated waste lands not sufficing for the purpose, and gradually undergoing diminution as cultivation spreads In a way, these reserves suffice ; but it is impossible to see the village cattle at the end of the hot weather, and not to feel convinced that if the present small cattle are to be improved. they must be better fed : and that they will only then be properly fed when a store of food *is raised and laid up for them.* At present there can be no question that vast numbers die of starvation and the weakness caused by insufficient food."

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UNDER these circumstances there can hardly be a doubt that to insufficient food may be attributed the chief sources of disease among cattle. On this subject, the Commissioner of Chuttisgurh remarks that the considerable mortality among cattle which occurred during the past year, was partly caused by the continuous heavy rain, and partly by the fact " that an insufficient fodder supply brought the cattle to a low state, and predisposed them to disease. The loss in all the districts has been so heavy as to appreciably raise the price of cattle, and to be a subject of universal complaint. From inquiries made from individuals as to actual losses among their own herds, I should estimate that in some villages as large a proportion as 20 per cent of the cattle have been carried off, and that in few villages has the loss been less than 10 per cent. Separate application has been made for sanction to assist the people, where necessary, with *tuccavee* advances." The Director of Agriculture in his report says that the principal cause of this heavy mortality was pleuro-pneumonia, induced by the excessive dampness of the season, but it is just as likely that the emaciated and weak condition of the cattle predisposed them to sickness. In the Nerbudda Division also, we are told the cultivators have lost a great many plough bullocks, and the Commissioner is of opinion that " the decreasing supply of grass, and perhaps also of salt has something to do with it. That forage for cattle cannot be had in sufficient quantity can be easily known from the fact that the price of grass has everywhere enormously increased of late years." Another reason for the mortality may be found in the fact that proper care is not taken of these animals, and the people do not show sufficient intelligence in segregating those which are diseased. " The people hardly believe," says the Commissioner, " in sanitary precautions as likely to affec[illegible]ir own health : and it will take time to convince them that [illegible]s to their direct interest to treat their cattle more carefully, and to provide for their sustenance more liberally."

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THE Deputy Commissioner, Balaghat, draws a graphic picture of the causes of mortality among plough cattle in rice-growing districts. " As a rule," he says, " during the hot months the cattle barely subsist on the especially scanty herbage then to be found in the cultivated tracts, with some allowance of rice straw. Cows are sent away to the pastures above the hills, but the bullocks generally have to take their chance. When the rains come on, they are put to the plough, and given a little extra food in the shape of mohwa and chaff ;

but for nearly two months they are kept working in the mud below and the drenching rain from above. The first month is taken up in the first ploughings, and the second in making liquid mud, knee-deep, for the rice transplanting. The only animals that can bear up against this kind of life are the exceptional few that are really well fed and cared for during the whole year. Everywhere, in the hills and plains alike, the cattle-sheds in the rains, with rare exceptions, are several inches deep in mud impregnated with urine and dung. In these, for three months, the cattle have to pass the nights. The roads and paths through the villages are worse : so that with great difficulty, the cattle can find a dry standing-place."

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Now when we come to reflect that this highly undesirable state of affairs is brought about mainly by the insufficiency of grazing lands, the prospects are not at all cheering when it is known that with every year, the cultivation of excess waste progresses, and the number of plough cattle to maintain becomes larger than the diminished pasture lands will support, it becomes a matter of necessity to adopt special measures for the supply of fodder. In this matter of cattle-fair, the report says :—"It would seem as though the very facility with which fresh cattle can be obtained to replace those which are lost, encouraged carelessness. Some of the cultivators in the Balaghat district buy and sell cattle at the beginning and at the close of every ploughing season. Every year large droves of cattle pass through most districts, on their way to local marts. Although no accurate statistics are available, the importation of cattle into these provinces and the number of head of cattle which are sold at the numerous cattle-fairs seem to be very great. Bullocks are imported from Berar, Malwa, Bhopal, Bundelkhund, Cuttack, from the Feudatory States on the eastern marches, and from district to district. At the great cattle-fairs of Garakhota and Kurai in the Saugor district, there was a considerable increase in the number of sales registered during the year under review. The Deputy Commissioner says that about 40,000 head of cattle were sold at the Garakhota fair which was held in February and March, and lasted four weeks. The Kurai fair is a weekly one : and between 40,000 and 50,000 cattle change hands there during the year. At Rahatgurh in the same district a small cattle-fair is held in the rainy season, where buffaloes are chiefly sold ; and purchasers come from as far as Chuttisgurh. There are cattle fairs held at Mahankali (close to Chanda), Sonegaon in the Nagpore district, Dewalwarra in the Wardha district, Tumsar in the Bhundara district, and at many other places."

These cattle-marts, it may be incidentally observed, are the only kind of fairs which do not seem yet to have suffered from the changes in trade effected by the railways. In every district there are held annual fairs or bazaars of a general kind, which are now less frequented than they formerly were. The reason is that the ordinary local markets are now better supplied, that people travel more than they used to do, and that they commonly resort to the large towns for the purchase of imported goods, in the certainty of finding there a wider range for the exercise of their choice.

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THE formation of laterite of the oxydation of ferruginous rocks is thus noticed in a paper on the geology and mineralogy of Malacca by the Rev. J. E. Tenison Woods of Australia. The paleozoic rock is largely mixed with poor iron ores, and [illegible]e the surface water charged with carbonaceous matter has come into contact with these ores, they have been oxydized and converted into a red and reddish brown limonite called here laterite. This laterite has been a geological puzzle to most of those who have written on the geology of the Malayan peninsula. It is remarkable what a variety of guesses have been hazarded as to its origin. Some writers who have pretended to offer an explanation seem purposely to have obscured their meaning from inability to deal with the difficulty. It has been called volcanic, and regarded as a tertiary outpouring of basalt, and so forth. As already stated, the real character of the stone is simply due to the oxydation of a ferruginous series of rocks. The formation which has mostly supplied the materials for the laterite is the stratified paleozoic slates, and the granite in contact with them. It is a decomposed rock. Water and air have been the decomposing agents. It is a most significant fact that there is no evidence whatever of recent upheaval from the sea, or even marine action. It would be hardly possible for this laterite or limonite with silicates of iron to be in course of formation without entombing some marine remains had they been in contact with them. Malacca is no exception to the general rule throughout the Malayan Peninsula that there is no evidence of recent upheaval in all the great extent of its coast line.

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A RETURN was lately published, giving an account of the imports and exports of the respective French and Portuguese colonies, from which it appears that, as regards the French possessions in India, the total value of all imports and exports is only 89 lakhs. Of this, 53¾ lakhs come under the heading of foreign trade, and 35¼ lakhs under that of the coasting trade. This appears to have been about the average figure for the last five or six years. Of the imports, only 1½ lakhs come from France and 1¼ lakhs from the United Kingdom, whilst 8½ lakhs come from the Straits Settlements, and 9¾ lakhs from ports in British India, the trade with the other French-Indian possessions only amounting to half-a-lakh. Of the exports, 22½ lakhs went to France, 1½ lakhs to the United Kingdom, 4¼ lakhs to Reunion, 6½ lakhs to the Straits Settlements, 24 lakhs to ports in British India, and a little over half-a-lakh to other French possessions in India. Turning to the Portuguese possessions, for which the latest return is that of 1882-83, we find that the total value of all imports was 20½ lakhs, and that of exports 17½ lakhs. The total customs duty collected on imports during the year was Rs. 20,737, almost the whole of which, with the exception of Rs. 191 for salt and military stores, came under the head of liquors. The total exports to foreign countries amounted to only one lakh, but those to other Indian ports came to 16½ lakhs. The import trade during the year was considerably above the average, and included railway materials to the value of 5½ lakhs. Our Portuguese neighbours live in the hope that when the railway from Bellary to Marmagoa is finished, the trade of their little port will be largely developed.

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IN the report on the operations of the Department of Agricultural and Commerce, N.-W. P. and Oudh, we find that owing to the release of the Awa estate from the Court of Wards in October last, the experiments conducted on the reclamation of usar for the last five years by Mr. W. J. Wilson, Executive Engineer attached to this Department, have now been brought to a close. They may be held to set definitely at rest many questions regarding the possibility of the reclamation of usar on an extensive scale, and as such to be of great value. Large as the cost, spread over several years, may collectively appear, it is in the end more economical than frittering away smaller sums in a spasmodic way on unsustained efforts with subsoil drainage, deep ploughing, manures, and various crop. Mr. Wilson's conclusions briefly are, that where canal silt is available it can be used for usar reclamation with every prospect of success ; and that the only other remedies feasible are the enclosure of the land for reclamation by the uninterrupted spread of usar grass and possibly with salt-bush and arboriculture. Under arboriculture again, *kikar* in moderately bad usar and *reunja* and *chaunkar* in bad usar are the only trees which have given notable results. Two plots of usar land were, with the sanction of Government, taken up towards the end of 1882 and enclosed. Out of several salt-bushes put down last year one only survives, but that is noticeable as growing well and strong in the open on a bit of usar on which there is no sign of any other sort of vegetation.* The rains of 1883 were unfavourable ; but this year the usar grass is making head, and there are a fair number of young kikar trees.

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IN the matter of arboriculture there would appear to be an unusually large sum realized by the sale of loppings and fellings in the Agra and Allahabad Divisions. Receipts from the sale of fruit, too, are much in advance of last year ; the Benares Division heading the list as usual with nearly half of the total income for the Provinces. The net cost under this head was

Rs. 21,587-6-3, against Rs. 27,312-12-4 in 1882-83. The number of trees planted out were far in excess of those of the year previous. It is noticeable, however, that the ordinary country mango is extensively planted, and that little or no attempts are made at introducing varieties, if grafts of several varieties were used for avenue-planting a considerable income, in excess of the present, would be realized from the sale of fruit and also from the sale of young grafted trees from nurseries. The attention of district officers will be invited to the subject, and efforts made to extend in this connection the nurseries established by different municipalities. In the matter of irrigation there is nothing special to notice save the fact of an apparatus invented by Mr. Twigg, the Collector of Hamirpore, for watering forced plants without destroying the fence. Briefly described, it consists of a long tin tube sheathed with split bamboos. One of these is carried on each water-cart, and one end having been thrust through the thorn fence, the water can be easily delivered from the earthen pot furnished with a nozzle fitting into a leather bag which is attached to the outer end of the tube.

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Experiments with agricultural implements were conducted as in previous years at Cawnpore, and for the most part on the lines indicated in last year's report. The kharif season of 1883 was characterised by scanty and ill-distributed rain and in consequence by a general outturn less than in the preceding year. The deficiency in rain, however, served to bring into greater prominence the advantages of deep over shallow ploughing; one ploughing with the improved farm plough giving 18 per cent increase over two ploughings with ordinary native plough. Thus the additional cost of an improved plough is quickly recovered in an increased yield. In the cotton experiments following the observation that the cotton plants on the outside ridges of the fields were the finest, plots were formed with ridges 3 feet apart. A large increase was obtained by that method from New Orleans and Nankin seed over plots where the seed was sown broadcast or in drills. The largest yield was 188 lbs. clean cotton to the acre obtained from selected and acclimatized New Orleans seed. The manufacture of sorghum sugar was carried out with no more difficulty than that experienced with ordinary sugarcane juice; about 1,600 lbs. were manufactured and sold well. The rabi season for 1884 was marked by an entire absence of rain, the crops having been dependent, for germination even, on artificial irrigation. Yet the maximum outturn, amounting to 51 bushels, was the largest ever known on the farm, and the average was likewise in excess of previous figures

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In the manure experiments cowdung proved to be the cheapest in comparison to its value as a fertilizer. Green soiling experiments were conducted on an extensive scale and results of value recorded. The experiments in deep ploughing were as successful as in the case of the kharif plots. An experiment of some interest was that of planting wheat on ridges alternating with fallow spaces, a substitute for manure being looked for in constant cultivation of the fallow spaces. This system has lately been experimentally revived in England and gives some promise of success. Laboratory experiments with usar soil showed that, to a certain extent, sulphate of lime (or gypsum) induced fertility, and larger plots are being treated *in situ*. Ensilage received continued attention, and juar forage was preserved successfully for eight months in simple pits dug in the soil. Elaborate experiments were made as to the feeding value of ensilage and figures given to show the cost of ensilising, the net result being that 8,000 lbs. of juar forage cost as ensilage Rs. 15-14-8 at a time when the same quantity of dry and inferior fodder was selling for Rs. 25. Amongst implements, the Duplex plough, devised at the farm by the Superintendent, gave excellent results, and the pattern of water-lifts in use was still further improved. The farm was well represented at different agricultural fairs, and has sent out large quantities of improved seed wheat. The indents for drugs for the Medical Department on Saharunpore Gardens were in amount double those of the previous years, and the distribution of seeds and plants showed an increase. Several additions of interest were made to the gardens, including the *Rhus vernicifera* (Japan varnish tree) and *Yucca draconis*. Improvement by selection of hot-weather vegetables and the acclimatization of European vegetables gave good results, particularly in the case of the Scotch Champion potatoe. Salt-bush (*Atriplex nummularia*) is now an established success and seeds freely.

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Interesting and instructive experiments were conducted in fruit culture, at the Lucknow Horticultural Gardens, and with several varieties of cottons; 14 new varieties of acclimatized flower seeds were added to the garden catalogue. An interesting experiment with *dub* grass showed that by scraping the surface, or "chiling," as practised by natives, an advantage of 10,320lbs. per acre per annum is obtained over the plan of allowing it to grow and then cutting with a sickle. The arboricultural and exotic nurseries show good results and progress.

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As regards sericulture, Messrs. Lister and Co. are pushing forward operations with energy, and have already completed far more than they stipulated for. Two hundred acres of mulberry have already been planted, and so far back as March last 200 acres more of land were cleared for planting, while there was an abundance of seedlings, amply sufficient for planting out a thousand acres. Fifteen-and-a-half ounces of seed used during the year produced 1,076lb. of green cocoon, or 67lb. to the ounce of seed, at a total cost of Rs. 110-9-5. From the cocoons reserved 20lbs. of seed were produced, worth at Rs. 5 per ounce Rs. 1,600. The management have hitherto felt the want of a sufficient number of rearing-sheds, which are now being rapidly constructed. As in the previous year, prizes were offered for the best cocoons produced under cottage cultivation, but the result was scarcely satisfactory, and there appears little hope of cottage cultivation ever becoming popular so long as cultivators are expected to rear the worms in all stages from seed. In August and September, 1883, a quantity of freshly-imported American tobacco seed was sent for experimental cultivation to seventeen districts of these provinces The result cannot, however, be said to have been generally successful, as only three of the districts—Pertabgurh, Gonda, and Unao—have reported favourably. The plants are here said to have flourished throughout, and in the end yielded a good crop. At Pertabgurh the cultivators are reserving seed for future sowings.

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A **contemporary** says that few people even know that the Malta lemon grows in India, yet that grown here differs in no way from the lemon of Malta, Sicily, Naples, Nice, Spain or Portugal. The care, moreover, with which it can be cultivated by budding on the common *Khatta* trees; the rapidity with which it grows—in three years rising to 10 feet in height and being laden with fruit; above all the utility of the fruit as an anti-scorbutic in unhealthy seasons, ought to make it far better known than it is. In soldiers' gardens, jail gardens, and hospital compounds it would be invaluable. In the Etawah jail gardens, for instance, three years ago Dr. Bonavia, who has studied the growth of the orange and lemon in India perhaps more than any one else, found only one lemon tree, which he had sent there previously, among many thousands distributed in different directions, from Lucknow. From this one tree, in three years, he has now 300 large trees in full bearing, sufficient to supply not only the jail but the whole neighbourhood [illegible] their fruit. If so much can be accomplished by individual effort, how much more might be effected by the aid of a little official impulse?

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We take the following from Messrs. Wm. Jas. and Hy. Thompson's circular on Indian Tea:—About 35,000 packages have been catalogued for sale since the 12th inst., 1,100 of these being Ceylon and 2,200 second hand and re-printed parcels. At the commencement of last week the tone of the market was affected by the continued dulness of the country trade, and prices for all but the best teas showed weakness; subsequently there was more demand, and rates for all descriptions closed firm. This week there has been healthy competition with a general desire to buy at previous prices, but the dealers do not yet find sufficient demands upon their stock to compel them to follow up any advance, so that the movement of the market, although upward, is scarcely perceptible. Comparing latest sales of fair to good Pekoes and Broken Pekoes with transactions earlier in the month, ½d. to 1d. improvement is quotable; fine Souchongs and Pekoe Souchongs are also dearer, but common sorts are unchanged, while for low Broken, prices are weak and irregular Ceylon Teas of the new crop are beginning to arrive and meet with ready sale: quality is not of equal merit throughout, but the bulk of the teas maintain their high character. The average price of 4,500 packages sold this year is 1s. 2½d. per lb. Deliveries are going on well.

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The following memorandum of the Agricultural Department, relating to the different varieties of wheat and the chief places and soil in which they are produced, has been issued:—

"It is quite impossible to reduce the numerous varieties of wheats grown in India to a uniform and scientific classification. Every district has its own names, and even if the same names are used over an extensive tract, they are often found, as is remarked in a recent work in which the subject is carefully examined, 'to be applied in different places to totally different varieties.' Sometimes the name denotes the color or texture of the grain; sometimes a peculiarity of the ear or stalk, or the character of the cultivation. But more often it is merely descriptive of the locality in which the grain is produced, or from which it is supposed to have first come. All varieties, whatever be the local names, may be primarily classed as white or red, hard or soft, and this fourfold grouping is recognised in the European trade. Adopting this classification, it appears that the soft white wheat, which commands the highest price in the English markets, is grown to great perfection in Northern India, Rajpootana, and Guzerat, and is commonly known under the names of *daudi* or *daudikhani*. It prefers a rich loam soil, well manured and irrigated, and a moderately severe winter. Soft red wheat ranks next in order of value in the European markets. Numerous varieties of this class are common in Northern India, and it is often sown intermixed with barley or gram. But the most valuable variety, under the name of *pissi*, comes from the Central Provinces, especially from the Nerbudda Valley. The predominant soil in this tract is a heavy black loam or 'cotton' soil, which owing to its fertility and its capacity of retaining moisture, will produce excellent crops in years of average rainfall without manure or irrigation. Of the hard wheats, the white variety is much prized by natives. It is less known in Northern India than in the Deccan and Southern Mahratta country. More delicate than the hard red wheat, it requires careful cultivation and irrigation. Hard red wheats also are little known in Northern India; but under the title of *kathia* wheats they form the predominant class in Rajpootana, the Central Provinces, and the Bombay Presidency. They are preferred to the soft wheats for consumption by the natives, and up to recent years commanded a higher price. The European demand for soft wheats has, however, brought the class of soft wheats, of which *pissi* is the best known variety, into greater favour with the cultivator. In the Central Provinces it was once not uncommon, it is said, for a ploughman contracting for service to stipulate that he should not have to eat *pissi* wheat more than twice a year. Now, a ploughman who demanded it twice would certainly not receive it, as its price is now at least 5s. a quarter higher than that of the hard wheats. This is an interesting illustration both of the care with which the native cultivator selects his seed, and of the quickness with which he adapts himself to the changes of the markets. A reference to Messrs. McDougall & Co.'s report on experiments conducted by them with Indian wheats, on behalf of the Secretary of State, will show that they assigned the first place in order of merit to the white wheats, and the second to the soft red. The former is on a par with English wheat and the best Colonial wheats. The soft red wheats are 4s. or 5s. the quarter less valuable. The information summarised in the preceding paragraph places the home of the former in the Punjab, the Meerut Division of the North-Western Provinces, and of the latter in the Central Provinces."

SILAGE IN INDIA.

We have noticed in previous issues, the origin, scope, and extension of the practice of ensilage in Germany, France, England, and India, and having given the heads under which we propose to discuss the subject, we will take them in order:—

I.—Construction of Silos.

Silos are nothing more than reservoirs for the preservation of green fodder. They are either wholly under ground or wholly above ground, or partly above and partly under ground. The practice obtaining in this respect in all the countries named above differs so much that no one particular plan can be recommended for adoption. The practice must vary to suit circumstances. In England, for instance, the plan most in favour and generally adopted is to convert old barns into silos. Attempts have sometimes been made to construct silos of wood and iron. In the report of the Bombay Director of Agriculture, mention is made of an iron boiler or reservoir improvised for the occasion to serve the purposes of a silo. Whatever be the details of silo-building, the points to be kept in mind in the construction of a silo are, that the bottom and sides of the pit should be made perfectly water tight. The sides should be perpendicular and perfectly smooth; and speaking generally, the corners should be rounded off. The length, breadth, and depth of a silo would, of course, depend on the quantity of green fodder required to be stored, the nature of the farm house economy in the cost of construction, and other local conditions. No hard-and-fast rule can be laid down for the construction of silos, much being left to individual experience. We would venture to suggest that in Bengal, for instance, old thatched houses and other buildings that disfigure almost every village might be utilized for such a purpose.

II.—Filling and Covering Silos.

When a silo has been built, the next question that arises is, how best to fill it? In this also, the practice varies. Some chop the green fodder before pitting it, while others prefer pitting it unchopped. At any rate the varieties of green fodder found in England admit of its being pitted without being previously chopped; so also in Europe generally. In America where maize is commonly used for ensilage, chopping is more generally resorted to than elsewhere. The size of the maize plant does not admit of its being stored unchopped; but grass and similar fodder could be stored, chopped or unchopped, to suit the convenience of the farmer. It may, however, be generally stated that if a crop be pitted unchopped, a great deal more treading and weighting would be necessary than if filled chopped. The latter process would, however, leave much less air-space.

While the crops are being pitted to fill the silo, particular attention should be paid to tread them layer by layer. This would pack the fodder up well, and serve to distribute more evenly the pressure caused by the weights placed at the top.

It is a general rule with farmers who resort to ensilage, to mix salt with the pitted fodder; and, as a convenient means of giving salt to farm animals, this method of doing so would meet the end in view. But whether it tends in any way to preserve or improve the fodder, is not definitely known. On this head, however, Mr. Jenkins, of the Royal Agricultural Society, writes:—"But if water of any kind or in any combination is in excess, my *impression is that the addition of salt* will injure the quality of the silage."

After filling the silo with fodder, the next process is the *covering* and *weighting*. In this as in the other processes, the practice must vary to suit circumstances. Some cover it up with boards, spread sawdust, earth or straw over them, and finally place weights above all. Others dispense with boards altogether, and use stones only, which both cover and weight the underlying mass. In fact, diverse contrivances are resorted to in covering and weighting the mass. The pressure caused by the weight varies from 40 lbs. to 2 cwts. per square feet. The mean, of course, lies between these two extremes, but this would be verified by experiment and careful observation.

The object of covering and weighting is simply to exclude the air from outside into the mass which, it is thought, would spoil it. The smooth perpendicular walls and rounded corners which we have recommended for general adoption in all silos would, we think, serve this purpose by presenting a smooth surface, thereby allowing even for shrinking of the green fodder.

FOREST ADMINISTRATION IN COORG, 1883-84.

We have before us the report, which shows on the whole that the administration of the forests in Coorg during the past year was satisfactory. The survey of the Ghat forests was nearly completed in May 1883, but some parts of the line will have to be revised. No additions were made during the year to the notified Government forest area, which remains at 233 square miles. Breaches of forest law were not frequent. The forest establishment is said to be too small for the increased work put upon it. The measures taken for the protection of the forests against frequent fires were on the whole satisfactory, especially when it is considered that the year was rather trying during the unusually long dry season from November to April. Natural reproduction was rather backward, and below the average. The production of seedlings under lanthana was not noticeable, as the seeds had not sufficient light for germination. The year was a good one for planting, and much good work was done in artificial reproduction. The teak plantations were enlarged by 126 acres, and the sandal plantations by 107 acres. The planted area now stands at—

Teak	429 acres.
Sandal	278 ,,
Fuel	85 ,,

As an illustration of the value of these areas for the sandal alone, it is shown that about 20 trees got to a ton, and as they do not require much room, it is thought that at least 400 trees per acre will remain for the final crop. Putting the price per ton very low at Rs. 300, the value of the crop will be Rs. 6,000 per acre. Sandal is said to come to maturity in 40 years. Discounting at 4 per cent, the value of these plantations is Rs. 1,300 or Rs. 3,31,400 for 278 acres. The cost up to date has been Rs. 22,900; this accumulated at compound interest at 4 per cent for 40 years will amount to Rs. 1,09,942, to set off against the magnificent total of Rs. 16,60,000. This calculation of yield and profit shows that the sandal is a valuable and remunerative tree of the forest.

The experiments with exotics were not quite as successful as might have been anticipated. A good proportion of the *ceara* seed germinated, but are reported to have been eaten by rats, and only about 200 plants remain, which are growing satisfactorily. Such of the *cocoa* plants as survived transplanting, are said to be doing well. They seem to have withstood the dry season wonderfully well. Kutampole, where the cocoa was planted, is situated at an elevation of 500 ft. above sea level, and appears to be quite a suitable climate for the cocoa.

The experiment with Cinchona planting, which was made mostly on land abandoned by coffee planters, was not successful. Those plants, however, that established themselves, were doing fairly well. The experiments with *wattle* (*dealbuta*) were not successful. The plants did not bear transplanting, and died when put out almost to a plant The Java figs and plants of *Kigelia pinnata* are said to be growing, but they suffer during the monsoon. Some seeds of *syncarpia laurifolia* were sown in beds and germinated well. There are about 200 plants put out.

The financial results of the year may be summed up as follows :—

	1883-84.	1882-83.
	Rs.	Rs.
Receipts	87,742	1,38,022
Expenditure	75,042	64,783
Surplus	12,700	73,239
Percentage of expenditure on receipts ...	85·4	49·9

The revenue is less than the estimate by Rs. 22,258. This is said to be owing to the non-sale of sandalwood, prices having gone down unprecedentedly. This is said to be due to the large sales which have been made in Mysore for some years past. The proportion of expenditure to revenue is much larger than in any previous years, owing, it is reported, to increased expenditure on productive works, such as plantation, which cost Rs. 19,393. But this is represented as capital well laid out, and expected to give a splendid return in due time. The receipts under timber have again increased. Those for 1882-83 were Rs. 26,221 ; for 1883-84, Rs. 36,771, shewing an increase of Rs. 10,550 on the previous year's.

Taken altogether, the present administration report shews satisfactory progress, and better results are looked for in coming years.

THE ANNUAL REPORT OF FOREST ADMINISTRATION IN THE PROVINCE OF ASSAM FOR 1883-84.

The Conservator, in his forwarding docket, states that the report has been "made as short as possible without omitting any essential information." This is a step in the right direction, though more might still be done ; the Assam Forest Reports have not hitherto been conspicuous for brevity or conciseness. From the concluding portion of his letter, however, we think we can discern a lingering fondness for the old style in the Conservator's breast, as he states that the shortening of the report is "in accordance with the wishes of the Chief Commissioner." It is not our purpose to review in detail the Forest work done in the Province, but merely to remark on a few of the prominent points, and to note where we think the report itself is susceptible of still further curtailment and improvement. Firstly, owing to the headings of work done, being in very small type in the margin, instead of having a separate heading in bold letters, it is very difficult to find the account of the different classes of work in the divisions. Next, there is too much detail given, regarding fire conservancy, plantations, and especially roads ; surely it is not necessary, nor of any general use or interest, to put in the petty details as to length of roads and cost as given at pages 18, 19, and 20 ; most of this might have been given in a separate statement, or better still, not given at all. Efforts are being made to reduce the cost of demarcation ; that of the Nowgong District, Rs. 20 per mile, is "high ;" of the Sibsagor division the cost is Rs. 10-4, and is "damned with faint praise" as being merely "reasonable, considering the great difficulty of obtaining labor in this part of the Province." In the Lukhimpore District it is "very excessive," *viz.*, Rs. 49 per mile, and it is satisfactory to know that an explanation has been called for ; but is there any necessity to state this in the Annual Report ? As far as one can gather it is one of the principal duties of Forest Officers in Assam to plod along over miles of demarcation lines every year, and a sort of record is kept up as to how many miles have been inspected by each officer. This is as it should be. A note is also kept of the number of days each officer is "absent on tour," so that no doubt, a healthy rivalry is established, and there must be strenuous efforts on the part of every officer to "cut the record ;" it is satisfactory to note that the present Conservator's record is better than that of any other officer, with the exception of the Durrung officer ; but then the Conservator's camp was absent for 33 more days. Harking back to demarcation inspection, we note that the Lukhimpore District Officer has only visited 41 miles out of 109, "which is altogether insufficient." It does not avail him that there was a press of other work and no elephants ; the Conservator cannot accept this as a "valid excuse ;" the work is apparently much more important than any other, and should have been done on foot, if there were no elephants available. The Cachar divisional boundaries have also been insufficiently visited, only 12 miles inspected out of 68 miles ; a very bad "record." The officer, it is interesting to know, "suffered from sore feet for the greater part of the working season," but this is considered a most unsatisfactory excuse ; from the nature of the ground apparently, elephants could not be used, and as the officer's feet were "sore," he could not walk. We note that the cost of demarcation in Cachar is Rs. 13-9 per mile, which is "somewhat high." On page 8, it is stated that an attempt was made to ascertain the number of trees in the Chirangduar reserve, and much detail is given with what object it is difficult to conceive, as immediately after, the Conservator throws discredit on the work, and from his "personal observation" (which is evidently of much greater value than any countings), "knows that there are nothing like that number of sal trees above 3 ft. 6 inches in the reserve." Surely in such a case it would have been better not to mention the work at all in the annual report. It is satisfactory to note that the establishment is on a better footing, and each member has now "definite duties;" before then, we can only imagine them to have been indefinite. An appendix, V, is given consisting of 5½ pages of close print which shows the different beats of the guards; this is most interesting, and we are sure, if every province followed this example, the Forest Department would get together in time a mass of information which would be of the greatest benefit in furthering the cause of scientific forestry in India. To show the importance attached to the posting of the forest *chuprassies*, or guards as they are called, it is laid down that none of them may be transferred without the "previous sanction in writing" of the Conservator; note that it must be "in writing"—verbal orders are not to be considered, apparently. This is very well in its way, but we are inclined to doubt whether it will not be found to hamper the Conservator, and unduly interfere with the powers of the Divisional Officer; it does not appear to be in the spirit of the ruling in the Forest Code; thus Section 19 provides that "the control of the Division will be vested in a divisional officer;" and this surely means that he has the power to transfer the establishment in his division. Seeing that Section 44 lays down that, he has the power to appoint guards, and Section 47 to fine, not only guards but "any of the members of the subordinate staff," it would seem to follow that he has also the power of moving them as he may think fit. Fire conservancy was not very successful during the year, owing to the unfavourable season; 39,000 acres being burnt out of a total of 134,000 attempted to be protected. The greater part of the area burnt was in the Goalpara Division, where the burning was intentional, and the divisional officer is mildly censured for not having the sympathy of the inhabitants with him in his labours. The Conservator appears certain that all that is wanted is sympathy, and there will be no more forest fires in Goalpara. The expenditure on fire protection in Assam has been very heavy already; we observe that up to the end of 1883-84, Rs. 51,000 have been expended on protecting some 95,000 acres; still there is no doubt it is money well spent; there must be an ample return in the shape of increase in natural reproduction. The private forest owners of Assam must be a singularly obliging class of men, as it would seem that they do not object to the Forest Department burning their forests; but it would be well to get their "previous sanction in writing," or complications might arise. There has not been much progress in artificial reproduction, only 34 acres having been added, of which 21 were caoutchouc and 13 timber trees; it was intended to extend the charduar caoutchouc plantation by 200 acres, but the Aka raid stopped all work. As before mentioned, too many details are given about planting works, such information as that about "sisu' (query ? sissu) "not doing well on the low ground," is quite out of place; what is required in an annual report is a general but succinct account of progress, omitting all petty details and dealing only with great matters. Looking at the general results of planting it cannot be said to have been very successful in Assam, considering the number of years it has been carried out. The plantation form, states that on the 31st March, only 1,223 acres have been planted at a cost of Rs. 1,04,577, or Rs. 85 per acre At first sight this would seem to be a fairly large area, but when area is dissected, it is found that from this number 1,025 acres must be deducted as they contain caoutchouc and bamboo; th[illegible] leaves only 198 acres planted with timber trees at a cost of [illegible],278 or Rs.112 per acre, not a very large area but in cost per acre decidedly so. A great deal of road-making has been done during the year—a very good thing in such jungles as Assam contains; but there is no necessity to take up two pages of the report with uninteresting details as to their length and cost. There is one fact upon which the Conservator is to be congratulated, which is, that, as stated by him in para. 141, "no timber operations are any longer carried on in Assam by direct departmental agency." This is a step in the right direction; when it is fully recognized, that a forest officer's time should be entirely occupied in taking care of his forests, and not in supplying the public with wood and charcoal, &c, then, and not till then, will there be any real progress in forestry in India. The revenue has been less than that of the previous year by Rs. 37,160—not a great decrease, but as the expenditure has been much greater than in 1882-83, there is a great falling off in the surplus; that for 1882-83 being Rs. 76,782 as compared with Rs. 11,883 in the present year. This is ascribed to the dull state of the timber market in Bengal, and to increased expenditure under live and dead stock, demarcation and improvement of forest, establishment, &c., and the Government of India in their resolution on the report consider the results satisfactory. The Conservator has devoted nearly two pages of the report to a very uninteresting account of his tour; this consists of the driest details of his progress, merely giving the date of arrival and departure at the different places, and a word as to the object of his journies. Surely all this might be packed away out of sight in the appendix. In the whole two pages, the only interesting fact is, that the Conservator reached Gauhati on the 21st January, and consulted the Deputy Commissioner about one of the departmental elephants which had killed a man! After this, follow the usual certificates of character of each officer, which are also to our thinking out of place. What general interest is there in knowing that certain officers had much improved in their management, and that others displayed very little zeal, or were sadly deficient in supervision of work, &c ? Such remarks should be made in a separate report to the Government if necessary, or more properly still, communicated in a kindly spirit to the officers themselves. Of course in the case of encomium, they do no harm; but censure, when made public in this way, does more harm than good. It is surely not the intention of Government that a man should be held up in this way, before the eyes of the world, on charges which are nearly always general, and may possibly be mere matters of opinion, based on insufficient data. The body of the report occupies 36 pages, which might easily have been cut down to about 25 pages; the next 29 pages are taken up with the forms ordered in the Forest Code, and then come 40 pages of appendices! A great number of these need not have appeared at all in the report:—for instance, Appendix IV is simply a stupendous account in minute detail of demarcation work and of each officer's demarcation inspection record; the time alone is wanting to make it read like an account in the field of a fifty-mile walk! Appendix V we have already alluded to; the guards appear like so many "sweet cherubs" who are "watching over" the various forests; this, though absolutely necessary for the divisional officer to have by him, is altogether out of place in the annual report. Appendix VI is hardly necessary, and VII and VIII not at all so; IX, X, XI and XII are laws, that is, rules published under the Forest Act, and have nothing to do with the annual report; the Forest Act itself might as well have been printed. Appendix XIII is a wonderful collection of statistics of value to divisional officers alone, and not ordered in the Forest code. The rest may be necessary, but we are not in a position to know; but in the case of XVI, the Chief Commissioner thinks that the information might be condensed, and at "pages 106, 107 the same figures are in some cases reported three times over." Statistics are most ensnaring; when once they are indulged in, the liking for juggling with figures always remains; and if not kept down results in madness, not perhaps, to the man himself, but to the unfortunates under him; who, taking no interest in them, are yet obliged to make out vexatious *nakshas*, year after year; and whose time is generally occupied towards the end of the year in dismal anticipations of the statements required with the dreaded annual report. We noticed not long ago that Sir Charles Aitchison remarked on the length of reports; let others remark on it, and in time we shall arrive at some sensible method of recording the year's transactions, which shall take the place of the dreary plan now adopted.

SOAP AS AN INSECTICIDE.

Professor Riley, the State Entomologist of the Washington Department of Agriculture, has found, after a long series of experiments, that common soap is about the best and cheapest insecticide that can safely be used in gardens. Alcohol is too expensive, and volatile oils more or less injurious to plants; experiments with some of the latter, such as naphtha, turpentine, &c., having resulted in the total destruction of some orange-trees on which they were tried. Crude petroleum, he says, destroys the bark; and even the refined oil in hot sunshine completely strips the tree of leaves. A mixture of kerosine with milk, which is subsequently diluted with water, was found to be apparently innocuous; but it requires trouble in the mixing, and care in using. The Professor makes the following remarks with regard to soap:—The value of soap as an insecticide has long been known; and the experiments which I tried with it were made chiefly for the sake of comparison with those made with other substances. The results, however, were so remarkable that I feel warranted in saying that taking into consideration its efficiency as a means of destroying scale insects, its effect upon plants, and its cost, there is at this time no better remedy known than a strong solution of soap. In my experiments whale-oil soap was used, and the solution was applied by means of a fountain pump to orange trees infested with the red scale of California. In the strongest solution used the proportions were three-fourths of a pound of soap to one gallon of water. The mixture was heated in order to dissolve the soap thoroughly; and the solution was applied while yet heated to about 100° F. The tree upon which the experiment was made was very badly infested, the bark of the trunk being literally covered with scales. Four days after the application of the solution, I examined the tree very carefully, and could find no living insect on the trunk of the tree, and only a small proportion of the coccids on the leaves appeared to be still alive. I was unable to examine the tree again personally, but three months later Mr. Alexander Craw, of Los Angeles, made a careful examination of this and some other trees upon which we had experimented and on this one he was unable to find any living scale insects. Taking into consideration the extent to which this tree was infested, and the fact that but a single application of the solution was made, the result is remarkable. In another experiment the solution was made as in the above, and then an equal amount of cold water added. The tree experimented upon was similar to the one used for the former experiment. Four days after the application no living insects could be found on the trunk of the tree and only a very few upon the leaves. In fact, the experiment was as successful as could be expected, it being very difficult to reach every insect on the leaves by a single application. When Mr. Craw examined this tree three months later he found but few living insects on it. As a result of all of my experiments with soap, I recommend the use of it in the proportion of one-fourth pound of soap to one gallon of water repeating the application after an interval of a few days. If a cheap soap be used which can be obtained for from four to six cents per pound, the cost of the remedy will not be great compared with what is to be gained.

Miscellaneous Items.

REPORTS from Cachar and Sylhet mention that rain was beginning to be badly wanted for the tea in those districts.

A NEW reservoir, 191 feet square and 40 feet deep, to hold nine million gallons of water, has been made at Maliga Kanda, the hill in the centre of Colombo.

A LARGE amount of stores of all kinds is being brought into Rawul Pindee, so it is probable that prices will not be so exorbitant as was at first feared.

ALTHOUGH the Amir's visit is some three weeks off, the prices of provisions in Rawul Pindee are daily rising. Gram has gone up 8 annas a maund in two days, and everything else in proportion.

IT is stated that the British India Steam Navigation Company's ship *El Dorado*, which was wrecked on the Birlings, off Lisbon, had on board, in addition to 600 tons of war stores, £80,000 in gold. An attempt is being made to recover a portion of the valuable cargo.

ACCORDING to the weekly report of the Assistant Superintendent of Police, North Malabar, dated 24th January 1885, "large quantities of pumice, originating no doubt from the volcanic eruption which occurred in the Strait in 1883, are drifting to the north-west along the Malabar Coast."

WE learn that the Government of India have approved of the abolition of the Saidapet Experimental Farm proposed by the local Government. In expressing their approval, they have given it as their opinion that the improvement of Indian agriculture must be as a rule based on native traditions and implements, but not on those of Western countries.

THE North-West Elephant Kheddah has wound up well, making a catch of nine elephants after a chase of fully 40 miles on the 3rd, when operations came to an end. The total catch was 44, of which 36 are alive. The Maharaja's best season was 29, so Mr. Greig has distinguished himself.

GROUNDNUTS are coming in from the districts to Pondicherry in much larger quantities than was expected, and the crop available for export is now estimated at between 400,000 and 500,000 bags, or about two-thirds of last year's out-turn; the price, however, is high, being, for the present, Rs. 21-4-0 per candy, delivered at Pondicherry.

WE are sorry to learn that over the greater portion of Purnea district, long black caterpillars have attacked the rapeseed and pea crops—the former when it was nearly ripe for reaping, and the damage done in some places has been so complete that the ryots have grazed down the crops with their cattle rather than pay the cost of gathering.

ABOUT twenty-one million acres of land in the United States are now owned by members of the nobility of Europe, chiefly Englishmen. How many acres are held by untitled aliens is not known. In the opinion of the Committee on Public Lands of the House of Representatives, this large alien ownership is an evil which should be prevented by legislation. The passage of a bill to remedy this state of affairs is under discussion, but with little chance of success.

THE Government passed the following order on the report of the late ploughing competitions held at Sydapet:—"The Government agree with the suggestions made by the committee, and observe that the arrangements, which were made at this exhibition for testing the general efficiency of the various implements used as well as the skill of the competitors, were successful. The proposal to hold the next exhibition in August, instead of in December, should be considered by the Director of Agriculture."

THE Government having directed the transfer to the Museum of the art exhibits which Mr. Havell, the Superintendent, collected during his recent visit to the South, he has pointed out to Government that such a step will not be in the interests of the School of Arts, as it is essentially necessary that the exhibits should be in the building where the drawing classes are held, and the location of a museum and drawing class in one and the same building, as obtaining at South Kensington, does not exist at Madras.

AN old Indian writes to the *Standard*:—"I see that your special correspondent states that our soldiers in the Soudan suffer greatly from the dry air of the desert, that their faces get parched, and that they are tempted to waste their precious supply of water. I have lived for many years in India, and perhaps my experience will be of a little service when I say that a little olive or other vegetable oil rubbed over the lips and face will prevent the parched feeling complained of, and that a small piece of lime or lemon in the the mouth will check thirst. It ought not to be a difficult matter to provide a lemon or two for each soldier leaving Suakim for Berber."

THE shareholders of the Colar Gold Company has decided, after some opposition, to ratify the agreement which had been made for them by the liquidators. Under this agreement they received £1,000 in cash, and 38,000 shares from the Indian Consolidated Company, who are thus placed in possession of a property from which great expectations are entertained, based on what has been already done in the same district. The Colar shareholders have already had a return of 6*d.* a share, and the present arrangement came on them in the nature of a pleasant surprise. In their own hands their property "was as dry bones;" it now remains to be seen whether the Indian Consolidated Company can kindle the vital spark.

THE exhibition of art workmanship for the Mayo prizes annually given at Bombay does not appear to have been very successful last year. There were 13 specimens of Kutch silver repousse work sent in—two by Oomersi Mowjee, and 11 by Hajie Dosal, while 11 ornaments were also sent by a silversmith at Hoshiarpore in the Punjab. The first prize of Rs. 150 was awarded to Oomersi Mowjee for a *lotah*, the form and design of which were said to have been far above the average of Indian work. Only one competitor came forward for the prize offered for enamelling, but his work was not considered sufficiently good to entitle him to a prize. It is to be regretted that one of the oldest art industries of India should attract so few competitors.

THE Agricultural Department of the Privy Council have published an official estimate of the yield of the cereal and other crops in Great Britain for the year 1884. England and Wales together produced a wheat crop of rather more than 77,867,000 bushels; or 1·19 bushels per acre above the estimated ordinary yearly average yield. For Scotland, the estimated total produce amounts to 2,348,000 bushels; at an average rate of 34·17 bushels per acre; or 1·48 bushels above the estimated ordinary average yield. The sum total of the results for wheat in Great Britian is thus brought up altogether to 80,215,000 bushels; the estimated average rate being 26·96 bushels per acre, or 1·19 bushels per acre above the normal standard of production. The variations in yield have been remarkable; and, even within the limits of a single district, estimated quantities of from 10 to 44 bushels per acre have been recorded, according to the character and situation of the land on which it was grown, and the mode of culture pursued.

MR. B. D. PLUMMER reported on January 13:—"At this time a Hindoo feast is going on, and our work is slightly impeded; otherwise all goes on well, and the lode in bottom of the mine is as good as reported last week. I informed you we should take down some lode from the hanging side. We have taken off 3 or 4 feet; the stuff is rich, and the lode looks healthy. Stamping goes on satisfactorily. We shall clean up at the end of this week, and the yield will come up to my expectation. We have treated all the old stuff which had accumulated before the trial stamping commenced. Surface work:—the masons are getting on very well with the foundations for the California stamp engine. In the first instance we intend to set up 12 heads; others can be added afterwards as they are required."

Selections.

FARMYARD MANURE.

BY DR. A. P. AITKEN,

Chemist to the Highland and Agricultural Society.

LONG before the exhaustion of the soil began to manifest itself, the attention of the husbandman must have been directed to the extraordinary fertilising effect of the dung of animals, and advantage of this experience would no doubt be taken to increase the productiveness of some part of the farm. As population increased and fertility diminished, a regular system of preserving and applying farmyard manure would gradually take shape, and become of ever-increasing importance, until eventually it came to be regarded as the very foundation of successful agriculture. In a new country and on a strong, fertile soil, there is no inducement, there is no economy in storing and using farmyard manure—it is a superfluous labour; but in all populous countries, and notably in our own, where the soil has been reduced by centuries of cropping, the basis of farming is the manure heap. Although in these days, importation of artificial manures has made farmers less dependent on farmyard manure than formerly, yet it is still, as of old, the central system of the farm, and its careful manufacture, preservation, and use are more than ever deserving of careful attention.

Farmyard manure consists of the solid and liquid excrement of animals, combined with the straw or other substance used as litter, and when fresh consists of about one part solid matter and three parts water. About one-half of the total dry matter contained in an animal's fodder is found again in the manure, so that it is easy to estimate approximately the amount of manure produced upon a holding in ordinary circumstances when the amount of dry matter contained in the fodder is known. For every 1000 lbs. live-weight of the animals fed upon a farm, the amount of dry fodder daily consumed is about 24 lbs., and if we add to the half of that one-fourth for litter, *viz.*, 6 lbs., we obtain the sum of 18 lbs., which represents the total dry matter in the manure. To this has to be added three times as much water, *viz.*, 54 lbs., and we obtain a total of 72 lbs. wet manure per 1000 lbs. live-weight per day. This is only an average, for when animals are fed mostly on turnips, containing 92 per cent of water, the manure will be much wetter; if on hay, much drier.

The loss of dry matter which occurs in converting fodder into dung is mostly loss of carbon, which is partly burned in the animal's body in keeping up its temperature, and is partly stored up as fat and flesh. There is also a loss of nitrogen, which amounts on an average to about a fifth of the total nitrogen contained in the dry fodder, but which may be more or less, according to the kind and amount of fodder and the state of nutrition of the stock. There is very little loss of mineral matter. The potash contained in the fodder is mostly voided in the urine, while the phosphoric acid is almost entirely contained in the solid excrement.

The manurial value of the dung is influenced by various circumstances. In the case of oxen in forward condition, the loss is very slight, while in the case of cows giving milk and in the case of calves or other young stock, more than half the nitrogen and about two-thirds of the phosphoric acid are lost to the manure.

The general character of the dung made by various kinds of stock is also very different owing to the different kinds of fodder, and the more or less perfect mastication and digestion to which it has been subjected. Milch cows fed on watery diet produce a dung containing only about one-sixth or a seventh of solid matter, while the dung of most oxen fed on a dry diet contains about one-fourth of solids. Owing to the perfect mastication which takes place in the ruminating process, the constituents of the dung are in a fine state of division, and the whole forms a mass through which air does not penetrate, so that the rotting process goes on very slowly, rendering it a very slow-acting manure. It is called a cold manure, since there is no apparent heat generated during its very slow fermentation. On that account it is necessary to mix it with a large amount of litter, in order to keep it free and permeable to air, so that the rotting process may be hastened. The dung of horses is a dry dung, and more open and porous, so that it ferments very easily and heats rapidly. When too concentrated, the heating is carried so far as to kill out the ferments in the heap, and cause a loss of manurial matter.

The urine of horses is also a more concentrated material than that of cows or oxen, and therefore it is very advantageous that the manure derived from oxen and horses should not be collected separately, but mixed together in a careful, uniform manner. The dung of sheep resembles somewhat that of horses, but it is somewhat drier, and therefore well adapted from counter acting the too fluid character of cow dung.

There are many questions that arise as to the making and using of farmyard manure. It may be asked whether fresh dung is not a better manure than that which has been preserved in heaps. It will usually happen that less loss of manurial matter occurs when manure is made directly on the field, inasmuch as the methods of preserving farmyard manure are usually imperfect. It cannot be said that the droppings left by cattle on a field are properly distributed; on the contrary, the manure is applied in about the worst conceivable manner. It remains for months protected by a hard resinous covering, and ferments with great slowness; it kills out the grass immediately beneath it, and renders that part of the pasture unfit for food for many months; the rank vegetation which grows on the spot next season is not acceptable to cattle, and the pasture becomes coarse and uneven. This might easily be avoided by a little attention, such as the employment of boys, or other unskilled labour, to scatter the dung and secure its more even distribution, or the removing of it altogether to the dung heap. The applying of fresh cow dung to the soil is not attended with any loss of substance, and in some cases is much to be preferred to any other method. This is especially the case when it is wanted to improve the mechanical condition of stiff clay soils; but, as a rule, some preparatory fermentation in the heap is very beneficial. The chief improvement that occurs to dung when heaped is the rapid rotting of the substance, whereby the hard straw or other litter is softened, and made more capable of yielding up its manurial substance to the roots of plants. The albuminoid matter in the heap is decomposed and converted into ammonia, and the ammonia is in turn converted into nitric acid, so that, from being a slow-acting manure, the dung becomes one of the strongest and most rapid manures on the farm. In cases where it is desired to prolong the action of the dung over a long period, it should be ploughed in fresh; but when it is wanted to expend itself chiefly on the crop to which it is applied, it should be as well rotted as possible. That the rotting process may be satisfactory, it is necessary that the manure heap be carefully made. It must be uniform throughout the whole mass, and this uniformity should be attained during the making of the heap rather than by turning it over at a later stage. When a heap is not uniform or equally fermented, the turning it over, although attended with some loss of ammonia, is to be recommended, as it is highly desirable to have the whole heap uniform; and the loss of the ammonia is not so great as is apt to be imagined from the pungent smell during the operation. When a manure heap is carefully mixed and layered in the making, and where there is a due proportion of litter and dung, the fermentation goes on equally through the heap, and there is no need of turning.

The preservation of farmyard manure is a subject which has been much neglected. There are now many covered courts and covered heaps, but as a rule the dung heap is exposed to the weather. In *wet climates this is a great misfortune, as even with the greatest care, it is scarcely possible to prevent waste, and if there is no special* care taken, as is usually the case, the loss of fertilising material is enormous. An uncovered manure heap in a wet district is the biggest hole in a farmer's pocket. In dry districts the loss need not be very great; and if care is taken in the making of the heap, it may be quite unimportant. While a dung heap is maturing there is a constant evaporation of moisture from the hot mass, so that it is apt to become too dry; and where the heap is under cover, it becomes necessary to run over the heap with water, or, better still, with urine. In a dry climate the amount of rain which falls upon the heap just about compensates for the loss of moisture during fermentation. In order that there may be no loss in such circumstances, the bottom of the heap requires attention. The water in the heap gradually drops down, and flows away as a constant brown steam highly charged with potash salts, and this may occur when the upper parts of the heap is too dry. It is therefore necessary to have the heap placed upon a dry bed of earth or straw, or some absorbent material, and it should be surrounded with a gutter filled with this absorbent, and the earth or straw, or whatever it is should be frequently renewed, the soaked matter being tossed up on to the top of the heap. When manure is exposed to the rain it had better not be quickly fermented, as in the process of fermentation the great change which occurs is the increase of soluble matter, and as this is liable to be washed away, it is well that manure which has to stand long should be very slowly fermented. In such cases it should be packed closely together, and exposed as little as possible to the direct force of wind.

There are some substances which are valuable in preserving manure and hastening its decomposition, but unless the heap is under cover or exposed to very little rain, they should not be used. Chief among these substances is *gypsum*. The effect of gypsum is to prevent loss of ammonia, and it may also hasten the nitrification process. It is a safe substance to employ, and it should be sprinkled over the heap as it rises, so that it may ultimately be fairly well distributed throughout the mass. Carbonate of lime or marl may also be added with advantage, and even fresh lime may be safely sprinkled through the heap in small quantity (about 1 per cent.) and if put only on fresh dung, there need be no fear of loss of ammonia. Fresh dung does not contain ammonia; it is only after fermentation has set in that ammonia is formed. The action of lime and its salts is to hasten the conversion of ammonia into nitric acid, so that nitrate of lime is formed, and as that is a very soluble salt, it would plainly be a mistake to encourage its formation in a manure heap exposed to rain and liable to leakage.—*North British Agriculturist.*

MR. T. NEILL ON SUGAR BOUNTIES.*

WE commend to the attention of the Board of Trade in general, and Mr. Giffen in particular, a pamphlet that has been published setting out in brief and clear terms the whole "case" of the sugar trade as against the foreign bounty system. We do so not because we agree in all that this valuable pamphlet advances, but because we feel that the Board of Trade has not yet thoroughly understood the arguments that it contends it has finally answered. This will be at once evident from a summary account of the pamphlet itself.

The author, Mr. T. Neill, is a well-known and experienced sugar refiner; and he writes in a dispassionate spirit which will do his cause far greater service than the passionate and obviously biassed denunciations that are far too common in this controversy. The issue of the pamphlet is explained in the words,—"At the request of a number of working men directly interested, as all workmen are, in the preservation of British industry, and directly and indirectly interested in the preservation of the special industries selected for attack by foreign Governments, and who desire to have in as short a compass as possible, the leading facts and opinions on the foreign bounty question presented to them, I have written the following pages."

There next follows an account of the "diplomatic efforts made by the Government of this country to obtain the abolition of the bounties," which provides an explicit summary of what diplomacy has attempted. Commencing with the declaration in 1863 of the French Government that "it is the desire of France, and no doubt of other countries too, to relieve the Treasury of a charge, *the only effect of which is to permit refined sugar to be sent to foreign markets at a reduced price*," the account tells of the five Conferences that were held in rapid succession, in the years 1864, 1865, 1866, 1868, and 1869; and how the series was then interrupted by the Franco-German war, but renewed in the years 1873 and 1874; in which year the French National Assembly "voted by a majority of 364 to 167 in favour of refining in bond," and again there were Conferences in 1875 and 1877, and invitations were issued for a final Conference in 1881, which only failed because Great Britain declined to assist on the conditions laid down by France. The fact that no less than nine Conferences for the abolition of bounties should have been held in 18 years, and chiefly on the initiative of the Continental Powers, is not quite in agreement with Mr. Neill's original contention that foreign Governments, by their bounty systems, have specially selected the British sugar industry for attack. Mr. Neill, however, is rightly of opinion that this record seems to show that "diplomacy has utterly failed to have the evil removed." But we must not therefore give up all hopes for the future; indeed, in our opinion, the very fact that so many attempts have been made at such short intervals goes far to prove that diplomacy may succeed in the end, for they show that among the nations concerned, there is at all events a will, if only we can find a way.

Working men, for whom this pamphlet is specially written, will profit not less than the Board of Trade authorities by the perusal of the clear account Mr. Neill gives as to "how the bounty is given," which is summed up in the general result that "fabricants," in the various continental countries, actually obtain a bonus of *from 1s. 9d. to 3s. per cwt.* In the description that follows of the effects of the bounties on raw and refined sugars respectively, the figures given are well worthy the close attention of the Board of Trade. Mr. Neill, indeed, assumes throughout that the bounties are the one only cause of all the results he tabulates, but among these results are two startling facts. The one is, that "the increase in the importation of soft sugar in 1884 over 1882 is 97 per cent;" and the other is, Mr. Neill points out, that "in 1864 the quantity of foreign refined sugar used in this country was only about 2¼ per cent of the total quantity of sugar consumed. Under the bounty system the quantity has been gradually increasing year by year, until it has reached 20 per cent."

In regard to the effect of bounties on raw sugar, Mr. Neill is not quite so successful in his statement. This is much to be regretted, as there is plenty of exact evidence which he has not adduced. His adversaries are sure to take hold of the somewhat contradictory statement as to the "demand for cane sugar having materially fallen off, and that a very large percentage of cane sugar has been replaced" by beet—placed in such close juxtaposition to the statement that in 1864 we consumed 523,203 tons of cane sugar, and in 1884, 598,001 tons. But he is perfectly right in declaring that cane sugar can be produced at less cost than beet. He weakens his case by agreeing with Mr. Ritchie's Committee that cane cultivation in the West Indies is at all perfect, or that "no want of attention can be charged against the growers"—because, as a matter of fact, very much remains to be accomplished by way of *improved methods of agriculture* and manufacture in nearly every one of our West Indan colonies.

Mr. Neill states well and concisely the effects of bounties to the British consumer. "It ought to be clearly kept in view what amount of reduction in the price of sugar which has recently taken place is due to natural economic laws and what amount to bounties. To the reduction from the former cause the British consumer is legitimately entitled to its fullest extent, and neither the colonial producer nor the home refiner can, nor I believe does, make the slightest complaint. . . To the reduction of price under the latter of the two causes mentioned above, *viz.*, State aid or bounties, there is no system of political economy yet promulgated which asserts that the consumer has any legitimate claim. It is to the reduction from this latter clause alone that both the colonial producer and the home refiner enter their protest, and desire the Government to adopt an efficacious remedy."

In estimating the amount of fall in price due to bounties, Mr. Neill shows conclusively that the whole of the bounty received is not expended in lowering prices, but only sufficient of it to enable the recipient to undersell English sugar in the English market; the remainder he retains, and the English consumer only gains that fall in price which is necessary to enable the foreigner to undersell the English producer. Mr. Neill does not enter into the wider argument as to the effect of bounties in causing overproduction and artificial glut of neutral markets. In discussing "the remedy," Mr. Neill has not noticed that the Select Committee did not, as he contends, report that a countervailing duty should be imposed, although he is quite correct in stating they reported in favour of manufacturing and refining "in bond." The international position, however, could not be better put than in Mr. Neill's words:—"Why, then, is it that when most of the bounty-giving countries profess a desire to abolish bounties on sugar, they still exist in every sugar-producing Continental state? The reason is, because they say no one State can individually cease to give bounties so long as its neighbour continues to give them, otherwise its manufacturers and refiners would be thrown out of the markets of the chief consuming country so long as that country is willing to admit bounty-fed sugar on the same terms as free-trade sugar." Mr. Neill next points out that France demands adhesion to the principle of countervailing duties, although England, "and, perhaps, Holland," are unwilling to agree to such a condition. Mr. Neill scores a decided point in reminding us that that Cobden's main argument was contained in the words, "we require corn at the natural price of the world's market . . . every source of supply freely opened;" and, on this he asks, "how can the natural price be restored to an article on which a bounty is given?" With the obvious reply that either the bounty must be abolished or the importing country must put on "a duty exactly equivalent to the bounty given."

The passages in this pamphlet showing that the particular countervailing duty proposed is not in itself contrary to free-trade principles; that it is not a protective duty; that in principle it could not be extended except to commodities that had received bounties; that it is not a retaliatory duty—are all clear expositions of the arrguments with which Mr. Giffen must contend. In disposing of the objection that such a duty would be an infringement of "most favoured nation" treaties, Mr. Neill's chief argument is that the duty would be imposed on the bounty and not on the sugar, asserting that "the countries sending bounty-fed sugar would be treated alike. . . . If they wished their sugar admitted on the same terms as non-bounty giving countries, all they would have to do would be to comply with the conditions which this country insisted on in the importation of sugar, namely, that it should not be bounty-fed." His argument comes practically to a request to Government simply to place as an item in our Customs tariff—applicable to all nations alike—"Sugar, bounty fed, duty equal to amount of bounty received—all other sugars free." We are afraid, however, that our Customs authorities have already declared they can only take cognisance of goods as they receive them, and that while it would be possible to take *beet sugar* and allow *cane sugar* to enter free, it would not be competent for them to draw distinctions according to what takes place elsewhere, but of which they have no evidence in the goods themselves.

In regard to the benefits of which a countervailing duty is declared to deprive the consumer and the refiner, Mr. Neil points out that the advantage to the consumer is, after all, but infinitesimal —"four-pence in the year per head of population"—and that all that the manufacturer really needs is to obtain his raw material at equal prices to his competitors. He argues that even the mere threat of such a duty would at once bring bounty-giving countries to terms, and that in this respect it differs from more retaliatory tariffs, in that it destroys directly the effect of the bounty and thus cuts away the only cause of its existence.

Altogether the arguments are stated with a clearness, brevity, and force that is bracing, and, as we have said, the pamphlet must be carefully studied by the Government authorities if they wish to know what arguments are being, and will be, pressed forward to influence public opinion. "It is the abolition of bounties that is demanded. The countervailing duty is only a means to that end. If the Government can secure the abolition of the bounties by any other method . . . then such a duty will not be asked for." The great object is that sugar, whether as a raw material or as a commodity ready for consumption, should be obtained in England "at its natural price, and with every natural source of supply freely open." Mr. Neill's pamphlet is calculated to render valuable aid at the present time, and it should be closely studied not only by those who are agitating this question, but also by those advisers of the Government who have discountenanced further action in the matter. It appears to us that all possible pressure should be brought to bear on Government to place the whole question in the hands of a special Commission, composed of two or three unbiassed and properly qualified experts, with instructions to negociate forthwith for a Convention among the powers interested. With a full and firm conviction as to the end to be secured, such a special Commission would readily devise some efficient means.—*The Sugar Cane.*

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* Foreign Bounties: how they affect working men and consumers. By T. Neill. W. Hutchison, Greenock, 1884.

WET WEATHER DETRIMENTAL TO THE HEALTH OF HORSES.

THE recent wet weather, although almost unseasonably mild, has increased sickness amongst live stock. Hard-worked horses, especially when burdened with long coats, become over-heated, and perspire exceedingly; the rough hair, in damp, close weather, interferes with healthy skin transpiration; animals not properly attended to when brought in from a heavy day's work, often stand throughout the night in what is virtually a wet, close-fitting blanket. If no worse trouble befall this chilling ordeal, the night's rest brings very inadequate refreshment, and the poor animal proceeds to work next morning dull and inert. With less vigour or recuperative powers, other horses under such depressing circumstances are attacked with cold, cough, or sore throat, varying in type and intensity according to predisposition of the care or nursing bestowed upon them. Not only does the mucous membrane of the air passes thus become irritated, and animals are laid up with colds in the head, throat, or chest, but from the like exposure others suffer from catarrh of the bowels, and are griped and attacked with diarrhœa. The damp, mild weather engenders still another class of ailments. Amongst hard-worked horses, both in town and country, swelled legs, professionally known as lymphangitis, are now common. Further illustration of retarded blood purification occurs in increase of rheumatism and of purpura, or transpiration of blood from congested weakened vessels of the mucous and skin surfaces. The wet weather has also multiplied the attacks of pink-eye, which has for three months prevailed, especially amongst the heavier class of horses, in London, and has increased the number of relapses and mortality. When most horses are dull, as they are apt to be in close, damp weather, slight ailments and premonitory symptoms are apt to be overlooked, and the horse, which should be rested and nursed, continues at work for one or two days, greatly damaging his chances of prompt and entire recovery.

How, it may be inquired, are horse owners during enervating damp weather to guard against such a chapter of ailments? Most, as pointed out, are traceable to impaired action of the important purifying skin functions. It will hence be essential to overcome as much as possible the mechanical difficulty which the skin has in doing its work in a damp atmosphere and with a low barometer. The close hair covering, saturated with moisture usually both from without and within, should be rubbed dry—an operation which, moreover, conduces to equable circulation. Excess of long hair, so seriously retarding drying, should be got rid of. Although it is injudicious to deprive horses exposed to all sorts of weather of the whole of their natural winter covering, there is no injury in trimming off the thick hair along the lower part of the body, the thighs, and arms, whilst long hair elsewhere may be singed off While these processes are in operation, or disease of any kind prevails, there should further be redoubled watchfulness for slight aberrations from health, such as the neglected meal, the staring coat, hot mouth, cough, or deranged bowels. And noting any such irregularities, the careful horseman will at once adopt some such appropriate treatment as an extra wisping, a dry, warm rug, or a comforting gruel with a stimulating draught.—*North British Agriculturist.*

THE THOROUGH-BRED HORSE—HIS ORIGIN AND BREEDING.

THE great son of Diomed, Sir Archy, did as much for the thorough-bred racehorse and turf in America as the Godolphin Arabian, King Herod or Matchem for that of England. Nearly all of the best horses in this country have been produced by his sons and daughters, and wherever stamina, quality, speed and great staying powers are shown, it would be found that there is a deep infusion of his blood. The best produce of the imp. Barb mare Sultana, whose dam and sire were presented by the Bey of Tunis to his Excellency President Jefferson, was Lady Burton by Sir Archy; she was the dam of the famous Couter Snapper, by imp. Chance, Robin Adair by Sir Archy, her own sire; Sidi Hamet, and Melli Melli by Virginian, son of Sir Archy and Meretrix, by Magog, son of Chanticleer, by imp. Wildair, Magog's dam by Symme's Wildair, son of Fearnought, by Regulus, by the Godolphin Arabian. Lady Burton's daughter, by Shylock, son of Bedford, produced Maria Shepherd, the dam of Lilac and Tishamingo, by Leviathan; Macbeth, by Sir Archy, and Betsey Ruffin, by Virginian. Sultana is the only Arab or Barb imported into America which had any substantial reputation, and that came from the Archy blood. The most reputable of Potomac's get, he a son of Diomed, was Tenny Cockracy, and the best of her descendants were Yankee Doodle and Maid of Lodi, by Virginian, Creeping Kate, by Sir Archy. Betsey Harrison and Susette, by Aratus, son of Director, by Sir Archy; Aratus' dam, Betsey Haxall, by imp. Sir Harry, by Sir Peter, by Highflyer, by Herod, his grandam Timoleon's dam, by Saltram, by Eclipse. Susette produced Berthune, sire of Release, and Rescue, by Sidi Hamet, and Isola by Bertrand. Betsey Harrison was the dam of Denmark, the noted old racer by imp. Hedgeford. The value of the Diomed and Sir Archy blood can best be illustrated by giving a few instances of its value when inbred, almost incestuously so. Duchess of Marlborough, by Sir Archy, dam by Diomed, was a superior race mare. The best of her produce were Red Tom, by Bertrand, son of Sir Archy, and the good race mare Luda, by Medoc, a great grandson of Diomed. The famous Lady Lightfoot, by Sir Archy, bred a number of colts. Black Maria, Terror, Shark and Bay Maria were her best, all by a grandson of Diomed, American Eclipse. Reality, by Sir Archy, was a famous race mare; the best of her produce were Medley, by Sir Hal, son of imp. Sir Harry, son of Sir Peter, by Highflyer, and Marion, by Alfred son of Matchem, Slender and Bonnets o' Blue, by Sir Charles, son of Sir Archy, his dam by Citizen. Slender and Bonnets o' Blue were superior racers, and the latter the dam of the noted Fashion. The famous Trifle, by Sir Charles, produced Gloriana, American Eclipse, and she produced Jack Malone and Pat Malloy, by Lexington, a horse with three direct crosses of Diomed through Sir Archy and Ball's Florizel. Lecompte, the first horse which ever ran four miles better than 7·30, was by Boston, dam Reel, by Glencoe. The great race mare Idlewild, the first mare to beat 7·30, running in 7·26¼, had four direct crosses to Diomed through Sir Archy, Ball's Florizel, and Eclipse. She was the dam of Wildidle, by Australian, that ran four miles in 7·25½. Lexington, the first horse to beat Lecompte's time, running in 7·19¾, has three Diomed crosses, and is closely inbred to Eclipse, Herod and Matchem. Fellowcraft, the first horse to beat Lexington's time, running in 7·19½, has four Diomed crosses on his dam's side and is much inbred to the three great lines of blood. Ferida, with the best record at four miles of any mare, has four Diomed crosses on the maternal side. Ten Broeck, by Phaeton, whose performances, one mile in 1·39¾, two miles in 3·27½, three miles in 5·26½, four miles in 7·15¾, have never been equalled, has no less than seven crosses of Diomed through his dam Fanny Holton. Drake Carter, the best long-distance horse now on the turf, has no less than fifteen Diomed crosses through his sire and dam; his three miles in 5 24 has never been equalled in the world. Eole, acknowledged to be one of the best race-horses ever shown, has seven crosses of Diomed through his best sons, Sir Archy and Ball's Florizet. Hindoo, one of the best race-horses of modern times, has five crosses of the same blood, three through his dam and two through his sire, Virgil. Louisette, the crack three-year-old filly of last year, has four crosses of this desirable blood. Glenmore, whose three heats of four miles in 7·29½, 7·30½, 7·31 have never been equalled in the world, has three crosses of Glencoe and four of Diomed blood. Miss Woodford, acknowledged to be the grandest mare of our time—her two miles in 3 33, 3·31¼, the best ever made—has nine Diomed crosses. Foxhall, one of the best race-horses ever bred in America, and winner of the Grand Prize of Paris, Cesarewitch and Cambridgeshire handicaps, has seven Diomed crosses. Wanda, by Mortemer, the crack two-year-old filly of last year, has seven Diomed crosses, and all of them are closely inbred to the three great strains of blood which originated and perfected the race-horse. Colonel Hoomes imported several other stallions: Dion, foaled 1795, by Spadille, son of Highflyer, by Herod, dam Faith, by Pacolet, son of Blank, by the Godolphin Arabian, out of Atalanta, by Matchem. He was a capital race-horse, but sired very few horses or mares. He, Col. Hoomes, imported Dragon, foaled 1787, by Woodpecker, son of Herod, dam Juno, sister to Diomed's dam, by Spectator. He sired the dam of Sally Walker and Dragon, dam by Truxton. Dragon died in Tennessee in 1812; also Druid, foaled 1790, by Potao's, son of Eclipse, dam Maid of the Oaks, by Herod, out of Rarity, by Matchem. He was a good race-horse. He was sire of Palafox, out of Mary Gray, dam of Wonder and Pacolet, by Tippoo Saib. Spread Eagle, imported by Col. Hoomes, was foaled in 1792 by Volunteer, own brother to Mercury, by Eclipse, dam by Highflyer, son of Herod, grandam by Engineer, son of Sampson, by Blaze, by Flying Childers, great grandam by Cade, son of the Godolphin Arabian. He was a superior race-horse, won the Derby in 1795, and was the only horse that beat the great Hambletonian winner of the St. Leger by King Fergus. Spread Eagle got some good stock, such as Maid of the Oaks, dam Annette, by imp. Shark; Floretta, dam by Hall's Union; Paragon, dam by Bellair; Red Eye, dam by imp. Shark; Adeline, dam by Whistle Jacket; Maid of the Oaks was dam of Young Maid of the Oaks, by Expedition, son of Pegasus, by Eclipse, and Active, by Woodpecker, son of Herod. Young Maid of the Oaks, bred to American Eclipse, a grandson of Diomed, produced Medoc, one of the best race-horses of his day, and a wonderfully successful sire. She also produced Cora, Midas, Highland Mary and Gipsy, all by American Eclipse, and Katy Ann, by Ogle's Oscar, son of imp. Gabriel, and Vixen, by imp Medley. Cora was the dam of Lucy Toland, by Priam, and third Boston, by Cost Johnson. Gipsy was the dam of Pryor and his two sisters, by Glencoe, owned by the late Keene Richards, one of which was the dam of Glycera and Colossus, by imp. Sovereign, the other dam of Reporter, by Lexington Alumina, by imp. Eclipse, &c. Katy Ann, bred to American Eclipse, produced Lady Thompkins, and so produced Tranbyant, by imp. Tranby; Motto, by Barefoot, son of Tramp, by Dick Andrews, by Joe Andrews, by Eclipse, his dam Rosamond, Buzzard, son of Woodpecker, by Herod, out of Rossbery, by Phenomenon, also son of Herod; and Fiatt, by Hedgeford. Motto produced Nannie Lewis, the dam of Aldebaran; My Lady, dam of Onward, by Ringgold, and Sallie Lewis, all by Glencoe. The latter produced John Morgan by Sovereign, Hunter's Lexington, Glenrose, Susan Beane and Acrobat, all by Lexington; Lotta, by Hunter's Glencoe, the latter the dam of the good race-horse Glenmore, by Glen Athol, Glenmore being very much inbred to Eclipse, Herod and Matchem; Susan Beane produced, by Leamington, Surquehanna, Onondaga and the great unbeaten Sensation. Leamington was much inbred to Herod, Eclipse and Matchem, having twenty four crosses of Herod, sixteen of Eclipse and ten of Matchem blood, besides numerous others to the original sources of the three strains of blood. Sensation, in addition to the blood lines in Leamington, derives a very large infusion of the same blood on the maternal side, in addition to four crosses of Diomed. Col. Hoomes imported many other stallions and brood mares, none of which were of any great prominence as sires or matrons. Speculator, by Dragon, son of Woodpecker, by Herod, dam sister to Sting, by Herod, out of Florizel's dam, by Cygnet, son of the Godolphin Arabian, was about the best. The cross appears in the pedigree of some good race-horses: Trumpetta, by Trumpator, son of Conductor, by Matchem dam by Highflyer, son of Herod, grandam by Eclipse; she was the dam of Trumpator, by Dragon; a filly, by Dare Devil, from which many good race-horses descended; and a filly, by Hickory, son of imp. Whip, by Saltram, which was the dam of Fertility, by Boxer, son of imp. Expedition, by Pegasus, by Eclipse; Trumpator by Sir Solomon, and others. He also imported Janette, by Mercury, son of Eclipse, dam by Highflyer; Favorite, by Volunteer, son of Eclipse, dam by Matchem; she was dam of Volunteer, by imp Bedford, by Hack-about, by Escape, son of Highflyer, dam sister to Syphon, by Tandem, by Squirt, by Bartlet's Childers; she was also the dam of Maid of All Work, by Stirling, son of Volunteer, and Harriet, by Highflyer; Miss Eagle, by Spread Eagle, and Cowslip, by Bedford; Gasteria, by Balloon, son of Highflyer, dam by Marske, sire of Eclipse, by

Squirt; she was dam of Cremona, by Spread Eagle, Miss Marake and Rosa Munda, by Bedford. He also imported Alexandria, by Alexander, son of Eclipse, dam by Woodpecker, son of Herod; she was the dam of Rosalba, by Spread Eagle, Megg of Wapping, by Bedford, and Poll of Plymouth, by Archduke. The families are extinct.—*The Turf, Field, and Farm.*

A COMPARISON OF THE COST OF LABOUR, AND THE PRICE OF PROVISIONS, BETWEEN 1834 AND 1884.

A VERY carefully-prepared paper on the economic and social conditions of Manchester and the surrounding districts, as they exist now, and as they were fifty years ago, was read in November last, before the Manchester Statistical Society, by its President, Mr. Robert Montgomery. Although the statistics refer specially to Manchester and the neighbourhood, they are applicable to all parts of Great Britain where manufacturing is carried on, and even to many agricultural countries.

As a result of careful investigation, Mr. Montgomery shows that the increase in the wages during the fifty years averages 40 per cent —that is to say, where 10*s.* was paid fifty years ago, 14*s.* is now paid; and if we take into account the lessened cost of the principal necessaries of life (for whilst some articles of food, such as meat, milk, butter, potatoes, and cheese have advanced from 10 to about 50 per cent, others have fallen to a much greater degree), which averages about 18 per cent, this 14*s.* is equivalent to 16*s.* 6*d.*

We all know that wages are much higher now, and the cost of many articles of food is much less; but it is only by a reference to statistics such as Mr. Montgomery furnishes, that we fully realize their extent.

The following gives the increase in wages in the respective trade:—

Trades.	Percentage of increase.
Spinning	63
Weaving	43
Drying	16
Calico printing	46
Calendering	47
Bleaching	32
Mechanical engineering	18
Glass-making	40
Macclesfield Silk trade	37
Building trades	46
Tailoring	53
Police	46

Average per cent of increase for all trades, 1834 to 1884, 40 7/12.

The following prices of the different articles of food are taken from the books of the Manchester Infirmary for 1834 and 1884:—

	Prices.				Percentage.	
	1883-84		1833-34.		Increase.	Decrease.
	s.	*d.*	*s.*	*d.*		
Flour, per sack ...	35	0*	38	0	—	8
Meat, per lb. ...	0	7¾	0	5	48	—
Milk, per doz. quarts,	2	6	2	2	15	—
Butter, per lb. ...	1	2	0	10	40	—
Cheese, per cwt. ...	66	4	60	0	11	—
Coffee, per lb. ...	1	0	1	10	—	46
Tea, per lb. ...	1	9½	5	0	—	65
Potatoes, per load ...	9	8½	7	6	29	—
Coals, per ton ...	9	0½	11	8	—	23
Soap, per cwt. ...	30	0*	50	6	—	40
Sugar, per cwt. ...	26	0	72	0	—	64
Gas, 1,000ft. ...	2	8¾	10	3	—	74

Rent is not brought into the account—but respecting this, Mr. Montgomery says: "Rent is probably a larger item in the expenditure of a householder living in a town than it was in 1834. The price of land affects the rent, and has increased manifold; but in this matter, as in those of food and clothing, our standard of comfort is higher, and if we pay more rent, we get a better house."

Mr. Montgomery, after *commenting upon the large sums, out of savings of the working classes, which are invested in Co-operative Stores and Limited Companies, concludes his instructive paper as follows:—*

The inhabitants of Manchester are now enjoying these advantages of communal life, most of which were wanting 50 years ago, literally without cost, for in the year 1834 the local rates in the township were 4*s.* 11*d.* in the pound, and in this year they are only 4*s.* 4*d.* In knowledge, manners, and even in morals there is improvement to note in the past fifty years. Education in more diffused, and assuredly more thorough. In economic conditions the advantage has been with the workman rather than the master, and this will remain with him if he will save his money and employ his political influence and power of combination in fostering the growth of capital and applying it to productive uses. In the social progress of half-a-century, all classes have shared; the poor most of all. And in a fuller civic life, wider corporate action and a more fruitful use of the nation's power, it may be anticipated that the working classes will enjoy a still more conspicuous advantage.—*The Sugar-cane.*

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* Estimated

WHAT IS THIS DISEASE THAT IS COMING UPON US?

LIKE a thief at night it steals in upon us unawares. Many persons have pains about the chest and sides, and sometimes in the back. They feel dull and sleepy; the mouth has a bad taste, especially in the morning. A sort of sticky slime collects about the teeth. The appetite is poor. There is a feeling like a heavy load on the stomach; sometimes a faint all-gone sensation at the pit of the stomach which food does not satisfy. The eyes are sunken, the hands and feet become cold and feel clammy. After a while a cough sets in at first dry, but after a few months it is attended with a greenish coloured expectoration. The afflicted one feels tired all the while, and sleep does not seem to afford any rest. After a time he becomes nervous, irritable, and gloomy, and has evil forebodings. There is a giddiness, a sort of whirling sensation in the head when rising up suddenly. The bowels become costive; the skin is dry and hot at times; the blood becomes thick and stagnant: the whites of the eyes become tinged with yellow, the urine is scanty and high-coloured, depositing a sediment after standing. There is frequently a spitting up of the food, sometimes with a sour taste, and sometimes with a sweetish taste; this is frequently attended with palpitation of the heart; the vision becomes impaired with spots before the eyes; there is a feeling of great prostration and weakness. All of these symptoms are in turn present. It is thought that nearly one-third of our population has this disease in some of its varied forms. It has been found that medical men have mistaken the nature of this disease. Some have treated it for a liver complaint, others for kidney disease, etc., etc., but none of the various kinds of treatment have been attended with success, because the remedy should be such as to act harmoniously upon each one of the organs, and upon the stomach as well: for in Dyspepsia (for this is really what the disease is) all these organs partake of this disease, and require a remedy that will act upon all at the same time. Seigel's Curative Syrup acts like a charm in this class of complaints, giving almost immediate relief. The following letters from chemists of standing in the community where they live show in what estimation the article is held:—

John Archer, Harthill, near Sheffield:—I can confidently recommend it to all who may be suffering from liver or stomach complaints, having the testimony of my customers, who have derived great benefit from the Syrup and Pills. The sale is increasing wonderfully.

Geo. A. Webb, 141, York-street, Belfast:—I have sold a large quantity, and the parties have testified to its being what you represent it.

J. S. Metcalfe, 55, Highgate, Kendal:—I have always great pleasure in recommending the Curative Syrup, for I have never known a case in which it has not relieved or cured, and I have sold many grosses.

Robt. G. Gould, 17, High-street, Andover:—I have always taken a great interest in your medicines, and I have recommended them, as I have found numerous cases of cure from their use.

Thomas Chapman, West Auckland:—I find that the trade steadily increases. I sell more of your medicines than any other kind.

N. Darroll, Clun, Salop:—All who buy it are pleased, and recommend it.

Jos. Balkwill, A.P.S., Kingsbridge:—The public seem to appreciate their great value.

A. Armstread, Market-street, Dalton-in-Furness:—It is needless for me to say that your valuable medicines have great sale in this district—greater than any other I know of, giving great satisfaction.

Robt. Laine, Melksham:—I can well recommend the Curative Syrup from having proved its efficacy for indigestion myself.

Friockheim, Arbroath, Forfarshire, Sept. 23, 1882.

Dear Sir,—Last year I sent you a letter recommending Mother Seigel's Syrup. I have very much pleasure in still bearing testimony to the very satisfactory results of the famed Syrup and Pills. Most patent medicines die out with me, but Mother Seigel has had a steady sale ever since I commenced, and is still in as great demand as when I first began to sell the medicine. The cures which have come under my notice are chiefly those of liver complaint and general debility.

A certain minister in my neighbourhood says it is the only thing which has benefited him, and restored him to his normal condition of health after being unable to preach for a considerable length of time. I could mention also a great many other cases, but space would not allow. A near friend of mine, who is very much addicted to costiveness or constipation, finds that Mother Seigel's Pills are the only pills which suit his complaint. All other pills cause a reaction which is very annoying. Mother Seigel's Pills do not leave a bad after-effect. I have much pleasure in commending again to suffering humanity Mother Seigel's medicines, which are no sham. If this letter is of any service, you can publish it.

Yours very truly,
(Signed) WILLIAM S. GLASS, Chemist.

A. J. WHITE, Esq.

15th August, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.

Yours truly,
(Signed) N. WEBB,
Chemist, Calne.

Mr. WHITE.
(B)

Registered No. 182.]

THE INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, MARCH 28, 1885. [No. 13.

Crop and Weather Report.

[FOR THE WEEK ENDING THE 18TH MARCH 1885.]

General Remarks.—The rainfall of the past week has been confined to a few districts in Bengal, Assam, to one or two places in British Burmah and Madras, and to Rawul Pindee and Sumbulpore in the Punjab and Central Provinces, respectively.

The standing crops are generally fair in the Madras Presidency, but the harvest yield is below the average. The *rabi* harvest is nearly complete in most districts of the Bombay Presidency. It is in progress in other parts of the Presidency, as also in Bengal, the North-Western Provinces and Oudh, Central Provinces, and the Berars, and gives promise of a good outturn.

In Mysore scarcity of water is becoming more felt, while the outlook for cattle and the prospects of the rice harvest are unfavourable. In Assam, crop prospects are generally good ; ploughing operations still continue In the Central India and Rajpootana States agricultural prospects are favourable ; the *rabi* is being harvested in Harowtee and Jeypore.

Cholera and smallpox are reported from most provinces, otherwise the public health is generally good.

Prices are rising slightly in parts of the Punjab, elsewhere they remain generally steady.

Madras.—General prospects fair, except in parts of Bellary and Anantapore.

Bombay.—*Rabi* harvest nearly completed in most districts of the Deccan and in Belgaum ; in progress in other districts ; standing crops injured by rust, blight, and drought in parts of Sindh, and by mildew in parts of Nassik ; cotton slightly injured by cloudy weather in parts of Broach ; scarcity of fodder and drinking water continues in parts of Dharwar and Belgaum ; fever and small-pox in parts of 11, and cholera and cattle-disease in parts of 9 districts.

Bengal.—Slight rain fell in a few districts ; ploughing operations for next season's crops are generally going on ; harvesting of *rabi* crops still continues ; *boro* paddy, *cheena*, and *kaon* are thriving ; pressing of sugarcane is going on with good outturn ; price of rice is stationary ; cholera and small-pox prevail in some districts, otherwise public health is good.

N.-W. Provinces and Oudh.—Weather seasonable ; harvesting in progress ; markets well supplied ; general health good.

Punjab.—Slight rain in Rawul Pindee district ; health and prospects good, except in Lahore district, where wheat crops attacked by *kunji* (rust) and suffering for want of rain ; prices slightly rising in Delhi, Mooltan, Rawul Pindee, and Peshawur, and stationary elsewhere.

Central Provinces.—Weather continues cloudy ; *rabi* harvesting almost concluded in southern districts, still in progress in northern districts ; cholera has broken out in Chuttisgurh, and cases of it have occurred in Nimar district.

British Burmah.—Small-pox prevalent in several districts, but for the most part trifling ; a little sporadic cholera also, otherwise public health good ; cattle generally healthy ; weather very hot.

Assam.—Weather warm in the day, but cool at night ; no crops on the ground ; common rice 17 11/16 seers per rupee ; one death from small-pox reported from Lbakhipore ; general health good.

Mysore and Coorg.—Standing crops reported withering in Bangalore and Kolar, but the area concerned is not large ; scarcity of water generally becoming more felt ; prospects for cattle and rice harvest unfavourable ; public health fair ; prices rising.

Berar and Hyderabad.—*Rabi* crops continue to be reaped ; *tabi* crops prospering ; general health good ; prices—wheat 14½, coarse rice 11, white *juar* 16, yellow *juar* 22, and *tur* 19½ seers per hali sicca rupee ; weather clear and warm ; prospects favourable.

Central India States.—Health and prospects good. Weather variable ; opium and other crops good.

Rajpootana.—Heat increasing ; grain being harvested ; some measles in Tonk ; otherwise, health good.

Letters to the Editor.

A STEAM THRESHER FOR INDIA.

TO THE EDITOR OF THE TIMES OF INDIA.

SIR,—I read to-day with much pleasure the succinct and correct account given by your correspondent of the trial with the steam thresher at Niphad. I hope that your readers will be glad to get more detail.

I saw the steam thresher at the Calcutta Exhibition. It is the work of Messrs. Marshall, Sons & Co., of Gainsborough, whose agents in India are Messrs. Balmer, Lawrie & Co., of Calcutta, After careful enquiry into the cost of cleaning wheat under the native system, I pressed on the Calcutta firm the advisability of experimental working with steam. The question was incidentally raised whether machines worked by hand or bullock power would not be more suited to the conditions of the country. I thought not. The native craftsmen cannot yet be trusted to repair machinery, and the jerky uneven work of the bullocks would be fatal to the success of the delicate operation of threshing wheat, I offered the use of bullock power ; but the offer was wisely declined. Messrs. Marshall & Co. have sent out a trained engineer, who has introduced the machine into parts of Russia, Italy, Spain, and elsewhere, while Mr. W. Gallon, C. E., has been deputed by the Calcutta firm. It is evident that whether the present venture is successful or not, it will show what special modifications are required to adapt the thresher to local requirements.

The engine is a small four H. P. one. The thresher separates the corn into firsts, seconds, and thirds. A fourth bag catches any unfinished grain which escapes the riddles, and the contents of this bag are passed a second time through the machine. The straw is separated into long straw, short straw, and chaff. This separation is not necessary in this country as far as the straw is concerned, but is unobjectionable. The separation of the good grain from the bad and from chaff and earth is of the first importance, seeing that a clean sample appears to be almost the only thing wanting to secure a certain market in Europe for Indian wheat and a price apportioned to its intrinsic value. The experiment showed that the machine can easily turn out 8 tons (216 imperial maunds) of good wheat (firsts) in a working day of eight hours. In order to calculate the proportion of the various products, a careful trial was made with 50 sheaves. The results were—

CORN.			
Firsts ...	...	92·2 per cent.	Absolutely pure grain.
Seconds	...	4·9 per cent.	Small and broken grains. The seconds contained no chaff or dirt.
Thirds ...	...	·9 per cent.	
Tailings...	...	·8 per cent.	Usually repassed through the riddles.
Grain in Straw	...	·1·7.	
STRAW.			
Long Straw	...	30 per cent.	
Short ,,	...	40 per cent.	
Chaff ,,	...	30 per cent.	

The firsts at the beginning showed a very small percentage of broken grains, but this was much reduced by alteration of the drum, which had been tightened in order if possible to bruise the straw. The short straw and chaff were very carefully dressed over again by hand, but were found to include no grain. The long straw alone showed the percentage given ; but this does not mean a loss to the owner of the grain, as will be shown. The straw was not reduced to "bhus" as when the wheat is trodden out by oxen. When this fact became apparent to the owner, his alarm began. He insisted on having the engine stopped. An enquiry was made. It was clear that the straw was not, as turned out, fit for cattle. The wheat awns remained unbroken, the chaff and long straw were hard and stiff. This was a rational objection. But most of the ryots irrationally asserted that it would be impossible to make it fit for fodder, urging that it would not be broken up by the oxen, without the help of the grain. To settle this point, the straw and chaff from 50 sheaves were trodden out before their eyes, and in half-an-hour were certified by competent agriculturists to be fit for fodder. I may state that it took three hours to tread out 50 sheaves in order to separate all the grain. The defect is easily remedied by the addition of a straw bruiser; which, however, cannot be brought out till next year. The next objection to the machine was that some of the grain goes over with the straw. As I have said, this is only with the long straw. The straw bruiser will again remedy this defect, for it is furnished with an extra set of riddles, which catch all the grain separated from the long straw. But even without the straw bruiser no loss need occur. When the straw is trodden out, the grain is all collected, and, as I have said, the time required to trample the straw is very small in comparison with that needed to beat out the grain. So far the objections made were rational; but when the bags which caught the good and the poor grains were shown, the ryot exclaimed, "Why should I suffer this loss? I can sell good and bad together." At the same time, the village Bunniah said, "This is good for the trade." I may here parenthetically remark that these expressions are pregnant with deep meaning. My interpretation is that, under present conditions, the ryot does not reap the benefit he should reap from care in preparing his produce. In his primitive method he cannot altogether keep out field earth and pebbles worked up from the threshing floor into his grain. The wheat merchants are compelled to recognize the fact, and accept tenders with a percentage of impurities. Even if this percentage is fixed as low as is possible, dishonest middlemen only clean down what they buy sufficiently to pass muster, and when they are lucky enough to receive a sample, containing impurities below the allowance, they say, "Why should I suffer loss? I would be a fool not to bring up the impurities, and raise the weight if I can make the wheat pass muster." And so the clean produce of the threshing machine, which is so necessary to raise the Indian wheat trade to its just position, will, if middlemen are not ousted in the matter, only put unjust gain into their pockets. It is for the Chamber of Commerce to assist in this crisis.

It must, however, be noticed that even if the ryot does not get a fair price for his produce, he cannot suffer loss by the machine. He pays a share of his grain as *baluta* to the village carpenter, blacksmith, and mhar, and he eats a certain quantity of wheat on feast days. The 8 per cent of produce which is not classed as good grain will not be more than is required for these purposes. True, he is no longer able to sell dirt as wheat, but I confidently hope that even under present conditions, the price he will receive for clean wheat will more than compensate him. The village bunniah even said that he would give Rs. 80 per candy for the wheat, whereas the market price was Rs. 70. I have sent samples to the Chamber of Commerce for opinion.

The next point is the charge which the owners of the machine will exact. The experiment, as may be inferred from the facts noticed, was carried out in the teeth of much opposition, yet showed that a charge of one anna per maund (of 82 lbs.) will pay the enterprizing firm, and this, based on the outturn, is of firsts only, the machine bearing all the cost of fuel, water and labour, save and except the carting of the wheat. Now I have satisfied myself that the treading out process costs the ryot, at the very lowest estimate, three annas per maund, when he has a strong wind to winnow with, and when his cattle are not absolutely required for other work. Dr. Fairbank, whom your readers know, and who was present at the trial, thinks my estimates too low, but I advisedly took care not to run the risk of fixing too high a figure when corresponding with Messrs. Balmer, Lawrie & Co. In many places wheat straw is of little value as fodder. Wheat straw is the least nutritive of the straw of all cereals. It is, unfortunately for the present experiment, almost the only fodder in Niphad, where wheat straw can be used as fuel (the machine is specially adapted to using it as such), the cost per maund is reduced to 8 pies. Not only is there a direct saving in cost of threshing, but there is as direct a saving in the fact that re-winnowing in Bombay is rendered totally superfluous. The Chamber of Commerce have estimated this cost at 3as. 2p. per maund. I believe a few other minor expenses are included in this figure. But there are other and more important results to be secured. In enumerating these, I will conclude what I have to say at present—

1. The cost of carriage is reduced, because dirt and other impurities are eliminated.

2. The wheat can be put into the market as new wheat almost as soon as reaping is completed. New wheat must fetch a higher price than wheat kept for a year in pits.

3. The loss which must result from pitting or otherwise preserving wheat is avoided.

4. The loss from wastage in transit and breaking of bulk is saved

5. The ryots' cattle are freed for field work, which, under present conditions, is neglected, but which would repay the farmer many fold.

6. The profits of middlemen are reduced, and with proper arrangements are capable of total extinction. This means profit to the grower, which now he does not dream of, and cheaper wheat in the foreign market, which can undersell the wheat from other countries, now gaining in the competition, owing to the apathy and ignorance of India. May I not add that if the owners of steam threshing machinery can either directly or indirectly ship the wheat direct from the machine to England, they will soon secure a special quotation in the home markets? They have the choice of the crops of the year. They can refuse to thresh a poor one, and can confine themselves to the best which the season can produce.

It cannot be yet expected that village communities or native zemindars will at once buy this steam machinery. But to my mind Messrs Marshall, Sons & Co. have wisely recognized this fact, and will reap profit from their foresight. Albeit the ryots of Niphad asked me, "Why do you bring this machine? Why disturb this calm current of our lives?" I verily believe that they think I have a pecuniary interest in the concern. Is there not encouragement in the success of steam ginning in cotton? Could it have been anticipated that ryots would have carted the seed cotton twenty or thirty miles to the gin and taken the seed back? It is a fact even now that ryots will cart their wheat even longer distances to secure a slightly higher price for wheat—a difference which seems absurdly small when the cost of cartage is estimated.

I am about to meet the machine at Puntamba in the Nizam's district, and, as noticed by your correspondent, the chief of Vinchur has bespoken it from the 2nd instant at Lasalgaon. The machine has a special drum to adapt it to threshing rice, and if I err not, it will be known throughout the length and breadth of the Presidency, where it has made its first appearance.—I am, &c.

E. C. OZANNE,
Director of Agriculture.

Poona, March 16.

Editorial Notes.

We are glad to learn that the Madras Government have awarded a gold medal to M. R. Ry. C. Kistnaswami Mudaliar of Shiyali, in appreciation of the interest he takes in the improvement of the agriculture of Southern India. Mr. Kistnaswami holds extensive estates in the Tanjore district, wherein he has introduced improved systems of agriculture, and at Shiyali he has opened a workshop where he makes improved ploughs of the pattern of Massy's, and sells them at a much easier price than that of the originals. Southern India—especially Madras presidency—must indeed be proud of possessing such excellent agriculturists as Messrs. Kistnaswami Sabapathi Mudaliar of Bellary, Bashiakarulu Naidu of Coimbatore, and Rungiah Naidu and Dhankoti Raju of Madras. The Government, by its recognition of the services of such gentlemen, gives indeed a healthy impetus to the progress of agriculture, which is, in fact, the wealth, nay the all, of Southern India.

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The report on the prospects of the wheat crop in the Central Provinces, for the month of February is as follows: "Returns of actual area under wheat have only been received from six districts, and they show that the contraction in area has been in some cases rather over-estimated; thus the deficiency of 32 per cent in Wardha has been reduced to 21 per cent, and that of 10 per cent in Damoh to 8 per cent. It is however quite impossible to make a precise forecast of outturn, and all that can be indicated with certainty is that the crop is an excellent one, and the excess of its outturn over the normal will more than compensate for any contraction in area. The produce of fields harvested experimentally in the Raipore district has given grounds for an all-round estimate of 13 maunds per acre for one of the principal wheat-producing tracts in the Provinces. Wheat is now selling in the Raipore market at one maund per rupee. Exports from the Provinces still continue at the rate of about a lakh and a half maunds per week, and the total amount exported up to date since October last is not le 3,300,000 maunds."

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A CORRESPONDENT writing from Niphar to a Bombay contemporary says :—"To-day was a remarkable day in the agricultural history of the Deccan generally, and the Nassick district in particular. The strong impetus that of late has been given to the wheat trade of India has induced the district officers and the Bombay Chamber of Commerce to take more than a passing interest in this important branch of our trade. Several efforts have recently been made to explain to the cultivators the paramount necessity of keeping their wheat free from dirt and chaff and grains of different varieties. Some of them have even afforded good seed selected by the Chamber of Commerce. The upshot of all these endeavours has been the importation of a thrashing and winnowing machine from Calcutta to this place, which is situated on the G. I. P. Railway between Nassick and Munmar. The working of this machine was shown to a number of agriculturists in the presence of Mr. Woodward, the Collector of Nassick, Mr. Ozanne, the Director of Agriculture, and several European and native district officers. The machine was worked by a steam engine by two European experts. Though the experiment did not quite fulfil the expectations of the kunbis, who always look upon an innovation with great distrust, the result taken, as a whole, was not discouraging. The machine worked with wonderful rapidity, and separated grain from husk and stalk so quickly that the natives who were present on the occasion were astonished with what was accomplished. Five gunny-bags were attached to the machine. All of them received grain that was being thrashed down in varying quantity and quality. The first bag received the largest and the best cleaned quantity; the second proportionately less than the first, both in quantity and quality, and so on. The wheat in the first bag was without the least dirt or chaff, and was such grain as would command very high price in England. The cultivators had, however, objections to the machine, the chief of which were that grain broke down to some extent, and that straw was not powdered down so as to be of use to them as fodder for cattle. Both these objections are remediable. In the case of the first objection there were 13 bags of the first quality to only one of broken wheat mixed with chaff. The experts in charge of the machine assured the people that this defect can be remedied. Considering the large proportion in which good wheat free from dirt and chaff was obtained, the machine cannot be considered a failure, because, even supposing that the drawback complained of cannot be overcome, the price that good wheat will fetch in the market will more than compensate the loss that may be sustained in broken grain. Besides, the work is done so quickly that a large quantity of new wheat which is always in greater demand, can be exported during the same season in which the crop was reaped. The other objection concerning straw can be met by making bullocks tread it as the farmers do at present. The kunbis, of course, shrugged their shoulders at all this. But there were enlightened native gentlemen present—the Vinchurkar and others, who have offered to give a fair trial to the machine on their estates. This spirit of enterprise is indeed creditable to them, and there is no doubt that their example will be eagerly followed by others at a time like the present when the price of wheat is rising, as the machine will give them an advantage over the orthodox system of slowly thrashing wheat by means of bullocks. As this is the first attempt of the kind on this side of India, it deserves every encouragement at the hands of those who have at their heart the welfare of the cultivators and the wheat trade of India."

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THE following report is furnished regarding the wheat crop of 1884 in the Rajpootana States (the figures are approximate only) :—" The total acreage of wheat grown during 1884 in Rajpootana, exclusive of the States of Jeysulmere and Dungarpore, amount to 2,224,784 acres, and the total outturn to 14,482,637 maunds, giving an average yield per acre of 6·50 maunds."

FROM a review of the Agricultural Department in the Madras Presidency, we find that Mr. Mills conducted a series of experiments in preventive inoculation for anthrax, according to M. Pasteur's method. The results so far are satisfactory, and in Mr. Mills's opinion establish definitely the following conclusions :—

(1) That the anthracine can be imported from Paris with safety.
(2) That it readily becomes virulent if the tubes are exposed to tropical heat for any time.
(3) That the tubes must be kept in an ice chamber.
(4) That all animals can be with safety inoculated.
(5) That the inoculations can only be conducted by a specially trained person.
(6) That animals so inoculated enjoy perfect immunity, but for how long has not as yet been settled.
(7) That the anthracine is a *highly dangerous* fluid in the hands of any one ignorant of its properties.

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THE experiments conducted by Mr. Mills for the denaturalization of salt so as to make it available for agriculture and cattle without detriment to the public revenue were failures, and the late Chemical Examiner, Dr. Rogers, gave it as his opinion that the problem was insoluble by chemical or mechanical means. The real solution of it will probably be found in the increase of facilities for transport and reduced prices. Mr. Mills notices a new drug, "nitrite of sodium," which, from experiments made by him, promises to be of great therapeutic value in the treatment of *paraplegia*. It has been tried successfully in the treatment of neuralgia and allied diseases of the human subject. The exact quantity of carbolic acid that could be administered to a buffalo has never been determined, but Mr. Mills's experience in the year under review shows that as much as an ounce can be safely given if it be properly diluted. The smallest dose of this drug is a dangerous and irritant poison, if administered pure and undiluted.

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MR MILLS's experiments with aconite have led him to the conclusion that the doses laid down in the various pharmacopœias are erroneous and misleading. The official dose is put at from 30 to 50 minims for a horse and from 40 to 80 minims for cattle. In Mr. Mills's experience 3 oz. were administered to a pony within a few hours without the slightest effect. A further experiment went to show that the *herbivora* can take fifty times the quantity of this drug that the *omnivora* can. Mr. Mills speaks again very highly of the antiseptic value of boro-glyceride, which he regards as almost a specific for unhealthy ulcers. Its price, however, Rs. 5 a pound, he considers to be prohibitive of its general use. The *Rudrakshan* seed, three hundred doses of which were sent out in 1882-83, did not prove of much value in the treatment of rinderpest, for which it was supposed to be a specific. Experiments were conducted, and are, under the orders of Government, being continued in animal cremation. A pamphlet on the subject written by Mr. Mills was widely distributed. Mr. Mills paid 134 visits during the year to the various slaughter houses in Madras. These visits which were entirely voluntary have, beyond doubt, resulted in good. It is satisfactory to know that the sanitary condition of the yards was generally good. Mr. Mills's efforts have had the effect of almost entirely stopping the slaughter of gravid animals, which was formerly frequent. His endeavours to prevent the spread of parasitic diseases by taking measures for the exclusion of dogs and the destruction at the slaughter-house of the cysts of the tape and other intestinal worms deserve all praise. All that is wanted is a chatty of boiling water. The butchers appear to have readily seconded Mr. Mills's efforts.

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THE statistics for that Presidency show that rinderpest and anthrax were the two most prevalent diseases during the year. The deaths from all diseases were 15,108, of which 7,824 were due to rinderpest, and 5,871 to anthrax. The latter was, as usual, more fatal of the two diseases, the deaths in the year being 64 per cent of the attacks; in rinderpest 46 per cent of the animals attacked, died. Both diseases prevailed in every district of the Presidency, but not to the same extent nor so fatally as in last year. The mortality from all causes was for the corresponding period of this year rather more than half that during the seven months embraced by the figures of last year, and the percentage of deaths to attacks was only 41·94 as against the 59·36 of 1882-83. It was found necessary to enforce the provisions of the Madras Cattle Disease Act II. of 1866 in the districts of Vizagapatam and Chingleput. Further enquiry has led Mr. Mills to conclude that his last year's estimate of the value of cattle, &c., was too low; and now, taking Rs. 25 as the average value per head of cattle and buffaloes, and Rs. 2-12-0 for sheep and goats, and deducting one-fifth from the total number on account of young and undersized animals, he estimates the value of the cattle lost from disease during the year at Rs. 2,68,080. In addition to their ordinary duties of inspection, advice and treatment, the District Inspectors attend all local cattle fairs and make reports on the cattle exposed there for sale. Some of these reports, Mr. Mills says, are excellent.

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The following report has been received regarding the prospects of the wheat crop in the Baroda State:—"Probable area in ordinary years, 69,982 acres; probable gross production when the crop is a 12-anna one, 82,900,555 lbs.; estimated area in 1883-84, 111,578 acres; estimate gross production on crores, 4,597,700 lbs."

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The question of storing water in tanks with a view to its utilization for irrigational and other purposes in seasons of drought, is one of some importance, and our farmers, cultivators, and the people generally would hail with satisfaction any means by which a good supply of water could be kept in tanks, with the least possible waste of the precious fluid by evaporation and other causes. A meeting of the New South Wales Royal Commission on Water Conservation was recently held, and some valuable suggestions were thrown out by the Inspector of public tanks and wells on the most useful methods of storing water in tanks and dams. It was pointed out by the Inspector that the expediency of storing water in deep excavations instead of in shallow ones, was of such importance that there was scarcely any need to go into the causes. It was however pointed out that the ratio of evaporation in shallow excavations increases in a compound ratio, and it was therefore recommended that tanks should be deepened, instead of having the evaporating surface increased by sloping the banks—a plan that is generally adopted in the excavation of tanks.

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It was also suggested that water-lilies (a plant that is common enough in India) should be planted in tanks and dams with the object of lessening as much as possible the loss by evaporation, if, as is supposed, the presence of these plants was likely to produce that effect. This is, however, a point which could easily be determined by careful observation.

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It may be added, in this connection, that on English farms it is the practice to plant weeping-willows, alders and other water-loving trees closely around water-holes, with the object of keeping the water cool, and preventing the banks from being injured, leaving only one opening, and that paved with boulders, for the access of stock.

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In the English climate, however, the question of water conservation, and the means of preventing waste by evaporation, are not of such moment; but here in India, they are a matter of vital importance. It may be remarked that the suggestion about planting trees round about tanks is one which must be received with caution, as it is pretty well known that plants absorb a good deal of moisture during the day through the pores of their leaves, and give off exhalations of vapour at night; so that any process which drew upon the tank for moisture would tend to reduce the water-supply. It is true that pools of water exist embedded in thick clumps of trees without any perceptible diminution of their contents; but this would only apply to situations where the sun did not penetrate *at all*. Lower Bengal teems with such pools; but it would be rare to find them higher up in the N.-W. P., the Punjab, and particularly in the sandy wastes of Rajpootana and Sind. It is for consideration, however, whether the suggestion about deep excavations in preference to shallow ones would prove of sufficient practical value if their surfaces are wholly exposed to the rays of the sun. If by any means these deep excavations could be shaded over with some dead material instead of by planting trees around them, there would be every prospect of preventing loss by evaporation. Any way, these suggestions will doubtless commend themselves to all interested in the subject, with the view of calling forth further expressions of opinion on a matter of so much importance as the conservation of water.

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The Government of Madras have lately had under consideration the subject of water-supply in the event of their existing stock proving inadequate to the demand during the ensuing hot season. There are two tanks—the Koratur and Ambatur, and two lakes—the Red Hills and Chembrambaukum—upon which the city depends for its supply of water for drinking and irrigational purposes. We would therefore commend to the notice of the authorities these suggestions of the New South Wales Royal Commission on Water Conservation.

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Every one interested in the expansion of the Australian trade with India, and especially in the export of stock to this country, will be glad to hear that Mr. Thompson of Sandridge has built a steamer named the *Bucephalus*, expressly for this purpose, and which, when the last mail left, was loading a cargo of horses, as well as cattle and sheep for our market. Mr. B. Gray, who was once upon a time a large exporter of horses to different parts of the world, was invited by the owner of the vessel to inspect it, and pronounce his opinion as to its suitability for the purpose. The following is the result of his inspection. He says:—"I found a steamer capable of carrying 350 horses, or a larger number of cattle, with some passenger accommodation. I had not the slightest idea that there was such a vessel afloat. Some 18 years ago I sent several shipments of horses to Colombo, also a few cattle and sheep to my friends, Messers. Rudd Bros., of that port, and although I spared no expense in procuring the best ships and fitting them in the best manner, the losses on each shipment were a heavy drawback on the transaction. I think I am safe in saying that in nearly all shipments to India and Mauritius since that time, heavy losses have been incurred, of course materially interfering with the trade. I was much pleased, therefore, to find that in this steamer there is everything necessary to minimise these losses to an extent quite marvellous compared to the days I refer to. The space allotted between decks to each horse is 3ft. × 9ft., with 10ft. in height, and some 18ft. from head to head in the rows. The hatchways are from 20ft. to 24ft. long, 10ft. wide, and there are four of these, supplying a current of air equal to any requirement, while 50 horses can be placed on deck in equally comfortable quarters, for the gunwales are some 5ft. high, and these are supported by iron arches, over which an awning can be thrown, thus protecting in all weather, furled in fair weather. All the fittings are of the most substantial kind, the floors battened and filled with sand between, and these are cleaned every two days, making all comfortable. The food is supplied in movable mangers to which the men have easy access.

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"Quite a novel feature in our export of stock to India were a large number of dairy cows that are being sent up for the purpose of establishing a herd of these cattle in the hill countries, and it appears to me that it will be a most successful venture, for there can be no doubt of the superiority of such stock over the native breeds, both as milk and beef producers, and comfortably lodged as these are in this fine vessel, I feel sure they will be landed in as good condition as when shipped. There was also a small lot of sheep, but I fancy those selected, being cross-breds, are not the animals suited to that climate; however, it will test the practicability of sending sheep to India; in fact, the whole shipment is one of great import to Australia, and such an enterprise as building this vessel lays all stockbreeders under a great obligation to her owner, and I see no reason why live stock could not be carried in such steamers to the English market, especially from northern ports, where such large tracts of country are being stocked. The facilities for putting stock on board this vessel are so great that a whole cargo can be walked safely on board in some three or four hours, and transhipped with equal facility. The lines on which she is built strike the most unnautical to be such as would ensure speed and safety, and Captain Currie told me her record was 12 knots an hour. No doubt, a good deal of the success of the trips of this boat is due to the sterling character or her commander, who strikes one at first sight as a thoroughly practical seaman, with his weather eye always open. The horses which form the chief cargo this trip, are the property of Mr. Learmouth, well-known in the Indian trade, and I think Colonel Williams must be more critical than he is if he rejects any of those I saw waiting to go on board. They were also in splendid condition, speaking volumes for the pasturage they had come off, and I shall be much disappointed if this does not turn out one of the most successful ventures of stock that Australia has shipped ; and have only to add that my description falls short of what might be said of so interesting a subject to stock owners."

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In our last issue, want of space prevented our taking more than a cursory view of the report on the forest administration of Coorg. We shall now refer to some interesting details connected with the subject. We are told that last year was a trying one. Owing to the long dry season, lasting from November till 20th April, numerous fires occurred which however were usually put out before much was burnt. There is no doubt that most of these were put in intentionally, so easy a thing to do that it is not surprising that no one was found out. To light a fire in the jungle is the work of an instant, and, before the fire is discovered, the person may be miles away from the place. The only thing to do, is to increase the number of guards, encourage vigilance by suitable rewards in case of success, and make smaller forester's charges. With the available means, every effort was made this year to ensure success. The two forests in which the worst fires occurred were Dubare and Hatgatnad. They are always difficult forests to protect : Dubare, because the labor is very uncertain and independent, and because of the coolies' habit of absenting themselves on bazaar's day and not returning for two or three days. It was during one of these periods that the big fire occured. Hatgatnad was most unfortunate in the forester getting seriously ill in the very nick of time. The ranger took up the work until another man could be brought up. This man being a stranger to the forest, the result was unfortunate as it was natural to expect. In the other forests the trees, although numerous, were not extensive. Much has been learnt by the year's experience, and no doubt a better success will be attained in future years. But the Coorg forests, overrun as they have always been by kurambars, yeravars and Coorg ryots after game, are certainly not easy to protect. The results however compare well with those of 1882, although the season was almost as bad as regards the duration of the dry weather. The area successfully protected was 113,665 acres out of 123,292 acres attempted, or 92·2 per cent. The cost of protection was Rs. 2,029 or Rs. 10-8-0 per square mile, against Rs. 2,446 and Rs. 13 per square mile last year. This saving of Rs. 2-8-0 per square mile is the result of better supervision and measurement of work, and is thus satisfactory.

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In the matter of artificial reproduction, the year was a good one for planting, and much good work was done. The teak plantations were enlarged by 126 acres and the sandal plantations by 107 acres. The planted area is now—

Teak	...	...	429 acres.
Sandal	...	...	278 ,,
Fuel	...	...	85 ,,

To show the value of these areas for the sandal alone, it is shown in para. 63 that about 20 trees go to a ton, and as they do not require much room, it is thought that at least 400 trees per acre will remain for the final crop. Putting the price per ton very low at Rs. 300, the value of the crop will be Rs. 6,000 per acre. From all that is known of sandal, 40 years seems to be the time for it to come to maturity. Discounting then at 4 per cent, the present value of these plantations is Rs. 1,300 or Rs. 3,31,400 for the 278 acres. The cost up to date has, it is true, been heavy, because experience has to be bought, but even that is a mere nothing when compared with the value. The total expenditure has been Rs. 22,900; this accumulated at compound interest at 4 per cent for 40 years will amount to Rs. 1,09,942, to set off against the magnificent total of Rs. 16,68,000. Previously planted areas were well tended. A few small new clearings have been made for sandal aggregating about 10 acres ; also 3 small clearings for teak above ghat, and one large one below ghat at Kutampole aggregating 150 acres. At Kutampole the clearing on being surveyed turned out only 37 acres, instead of 60 as was estimated. This arose from the deceptive nature of the land, and to avoid any mistake of the kind this year, the new clearing has been surveyed before planting and turns out about 140 acres. Mr. Tod, the contractor, has received the contract rate for planting 60 acres, and thus owes the department a considerable amount, namely, the contract rate for planting 23 acres, which will have to be deducted from the amount he has to receive during the year for planting the new clearing.

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The new plantings at Kutampole, both those of 1882 and 1883, have been very successful, and the growth of the plants is remarkable, compared with other plantations in Coorg. In December last, the plants being then 19 months old in the 1882 clearing and 7 months old in that of 1883, the former averaged 11ft. in height and the latter about 3. Since that, however, owing to the long dry weather, there has been hardly any growth. The work done at Karmad was principally clearing the weeds in the lines, cutting creepers, girdling old jungle trees of which there are still a good many left, although the work has been going on for a good many years at intervals. If it had not been for them, something would have been obtained already from thinnings, but the latter have been as yet too insignificant to mention. By clear felling and careful weeding from the first, the new plantations will be made to pay very much sooner than the old ones, which were planted partly under shade and allowed to get weedy directly after planting. A clearing of 30 acres was opened in Anekadu in North Coorg, and successfully planted by the forester at the rate of Rs. 43 per acre. It is hoped that this rate may be lowered for future clearings. Scraping was resorted to to get rid of the enormous stifling crop of grass which grows up as soon as jungle is cleared, and prevents all tree growth except that of the inferior fast growing kinds. This operation is expensive, but will be cheaper in the end than constant and what seem to be interminable weedings. Teak nurseries for the coming season's work are ample, and contain more plants than will be required for the plantations. What remains over will be put out in open spaces in the forest. The sandal plantations were fairly successful, and would have been more so, had it been possible to allow money. As it was, in North Coorg somewhat more land was got ready than was ordered, and it was necessary to stop some of the work. The areas left unstocked on this account are being now cleared, and will be planted up in the coming season. With the 278 acres now fully stocked, it will not be necessary to make large additions in future, and there will be a good deal of work to consolidate what is already planted.

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In South Coorg, owing to a scarcity of seed very little was done to supply up the half-planted areas in Nalkere and Karmad, measuring in all some 15 acres. This was unfortunate as a year's growth was lost, and the same weeding had to be done as if the plants were really there. At Titimatti the forester did good work, and this is now one of the best sandal plantations in Coorg next to Gangavara. The average cost for new work was Rs. 49 the acre and for weeding and up-keep Rs. 15. It is probable that considerable expenditure will be incurred for some years on the up-keep of these, as it is noticed that even in the oldest parts (4 years old) a thick crop of grass still grows up, and if the grass is allowed to get any height, and partially cover the trees, the branches die back. The growth of grass is however becoming much less thick, so that gradually the weeding expenses must diminish. In a few years it will be possible to allow a limited amount of grazing which will effectually keep down weeds. Some of the older planting might now be grazed over, but they are too small to make it worth while to fence them off from the younger bits. It is, however, better to lay out money on weeding and insure the future of these plantations so long as due economy is observed. This year's experience has shown that sandal grows better with lateral shade than alone. To get this lateral shade all jungle-tree stumps in the clearings are now allowed to keep their shoots, these being kept within bounds by judicious thinnings.

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THE report on the prospects of the wheat crop in the North-Western Provinces and Oudh for the month of February is as follows:—"Wheat area of United Provinces is 5,266,319 acres, which is greater than January area by 57,667 acres, and greater than normal area by 300,636 acres; taking normal at 100, the area now under wheat in the United Provinces is 105. Area under white wheat, 1,211,762 acres; under red wheat 2,003,643 acres; under mixed red and white wheat, 2,050,914 acres. The crop has suffered a good deal from rust caused by the cloudy weather and easterly winds following immediately upon the rain of the end of January, and prospects are not so good as in January. Taking 100 to denote full average, the condition of the crop is as follows:—56,264 acres stand at 100; 160,515 acres at 90; 1,346,124 acres at 84; 3,309,963 acres at 75; 93,453 acres at 66. The gross outturn of a full average crop would be 2,480,000 tons. The February estimate of the season's crop is 1,950,000 tons, Taking 100 to denote full average crop, season's crop thus stands at 80."

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A SHORT time ago, Mr. Commissioner Loring, the head of the American Department of Agriculture, delivered an important address at the National Convention of Cattle-breeders, held at Chicago, with special reference to the cattle and dead-meat industries in the United States. The figures quoted by him show that the enumeration of the cows in all the States and territories gives 13,501,206, and that of other cattle gives us 29,046,101. The estimated value of the cows is $423,486,649, and the estimated value of other cattle is $683,229,054. The total amount of this species of property is $1,106,715,703. The average value of the cows is $31·37, and that of other cattle is $23·52. New York has the largest number of cows used in the dairy (1,510,904), and Wyoming the smallest (4,533). New York has $54,89,142 in cows, and $33,084,771 in all other cattle. Wyoming has $149,589 in cows, and $23,446,550 in other cattle. The improvement of cattle by care and judicious breeding during the last three-quarters of a century, is made evident in a table giving full details on this point. In the New England States, the value of this improvement is 34 per cent; in New York, New Jersey, and Pennsylvania, 38 per cent; in the Western Central States it is $125,575,324 on $316,007,714; in the Cotton States, $36,802,499 on $106,629,757. In an investigation by the Bureau of Statistics of the Department, made last April, estimates of the number of high-grade cattle ranged from 5 per cent in New Mexico to 40 per cent in Ohio and Kentucky, and averaged 18 per cent, or 7,723,539 of a total of over 42,900,000 animals. An attempt was made to indicate approximately that portion of the present value of cattle represented by improvement in breeding since the introduction of improved herds—that is, of the present value of all cattle, how much is due to the efforts of breeders, and what would be the value of present stock if in size and quality of the unimproved natives. The average improvement is 35 per cent, and amounts to $287,000,000. This would make the value of cattle, as unimproved natives, $819,000,000, and the real value, as improved, 35 per cent more, or over $1,106,000,000. To show the extent to which improvement, by superior blood, has been carried, attention is called to the large percentage of high-grade cattle now found in the States and territories. It is interesting to know how large this percentage is in States where agriculture is the leading business. While in some of the States the amount of high-grade and pure-bred cattle is only 8 or 9 per cent, in Kentucky it is 40 per cent, in Ohio 40, in Indiana 33, Illinois 35, and Massachusetts 32 per cent. The total number of horned cattle west of the Mississippi River is estimated at 21,943,574, with a money value amounting to $533,650,871 divided among the States and territories of that section. Arizona, with 216,057 horned cattle, valued at $4,484,352, stands lowest on the list, while Texas represents the largest number, 4,945,261, valued at $91,256, 301. Iowa comes next, with 3,040,887 cattle, at $85,302,255; Missouri, 2,009,647, at $49,087,375; then Kansas and Nebraska.

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THE entry of beef and cattle into the American foreign trade was a point dwelt upon by Mr. Commissioner Loring, who gave some comparative tables, showing the growth of this branch of commerce during the last four or five years. The exports of beef during the fiscal year ending June 30, 1884, were—

		lb.	$.
Fresh beef ...	...	120,784,064	11,987,331
Beef, salted or cured	...	43,021,074	3,270,083
Beef, canned ...	...	...	3,173,767
Total value for 1883-84	...	...	18,431,131
Total value for 1882-83	...	...	16,663,345

The exports of fresh beef exceeded those of any previous year. The nearest approach in former years was 106,004,812lb. in 1880-81. The export price in the year 1883-84 averaged 9·9 cents per lb. The number of cattle exported also largely increased, being 190,518 against 104,444 the previous year. There were about 360,000 slaughtered beeves exported, which, with 190,000 shipped alive, make a total of 550,000 beeves exported. Exports of cattle were formerly of the long-horn race from Texas and Florida to Cuba and neighbouring islands. They were valued at $16 to $17 per head at most, and those of Florida sometimes $13 to $14. This southern trade had little variation and little growth from 1850 to 1877, when the era of exports of fat beeves to Europe began. The northern exports from 1870 to 1876 inclusive did not much exceed 1,000 annually, but increased with wonderful rapidity after 1877. The exports from Boston and New York show this increase, and the miscellaneous exports have been mostly from northern ports. The largest proportion of these exports have gone to England, though they have found distribution in Scotland, Germany, Belgium, France, Cuba, and other countries. The trade to Mexico is mainly young or stock cattle. Cuba takes beeves of the Spanish type at a low value. Canada receives stockers and beeves of northern breeds at much lower prices than the fat and heavy beeves shipped from New York and Boston.

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THE report for February on the prospects of the wheat crop in the Berars is as follows:—"Wheat crop in good condition and nearly reaped. Area under crop 2 per cent above average, being 819,033 acres average yield generally reported; it is anticipated that the total outturn of the Province will come to 122,000 tons. At beginning of year, 40,496 tons wheat was in store; of this 16,600 tons were exported to end of December by rail."

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THE areas of unreserved forests under the control of the Forest Department have decreased by 245 square miles. During the last camping season it was discovered by the Divisional Officer in the Lahore Division that settlements were forming in our unreserved *rakhs*. This might have become a danger to complete control over these *rakhs*, and at some future time have affected the very area of Government property by the acquirement of rights. The history of these settlements is that in such *rakhs* where zemindars and others had been allowed to graze their cattle, either under contract or on *tirni*, they had built themselves huts of grass and mud, and constructed cattle-sheds. These were at first of the most temporary character, but since then people always returning to the same *rakh* have made themselves more comfortable, and these huts are now never pulled down and are rarely unoccupied, and have been added to year by year. The majority of these settlements have been started within the last six or seven years by villagers whose cattle have increased to such an extent that they have been obliged to almost permanently remove from their original villages. They bring their families out into the *rakh* during the winter, and only send them back to their parent villages during the hot season. These settlements have now in the Lahore Division all been carefully measured up, and a ground rent of one rupee per *ghumao* is levied from the occupiers, and an agreement is taken from them stating that they have no right or claim to the land, and that Government may turn them out at any time without compensation.

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The management of the grazing areas in the Punjab is a question of great importance and great difficulty. The inhabitants of the great southern Bar districts are entirely dependent on it, as the annual rainfall is by no means in every instance sufficient to permit of agriculture being carried on as the main means of livelihood; moreover, the water is in very many places too far from the surface to allow of extensive well-irrigation. Altogether these people live under difficulties from which the inhabitants of the happier situated irrigated districts and the districts underlying the Himalayas are luckily exempted. If left to themselves, the dwellers in the Bar will permit their herds to increase in favourable years, and consequently suffer still greater hardship in years when rainfall is scarce. It will be therefore our duty to create much more extensive grass reserves for such eventualities than has been done as yet. The scarcity of grass occurs both annually and periodically, and two kinds of reserves should consequently be created; those to supply the annual want to be opened in those months when the scarcity in the outlaying grazing-grounds is mostly felt, which may be earlier or later in the season according to the rainfall of the year, but falls as a rule between October and the summer rains. The latter reserves, those closed for periodical scarcity, should only be opened when such extreme scarcity really occurs, though in other years the cutting of grass might be allowed in them at the end of the season. In the plains districts, which are either irrigated or which underlie the Himalayas, and have consequently a sufficiency of moisture and rainfall, the grazing question, though it may become an annoying one, can never be one of the same vital importance. In the Lahore District the steadily increasing pressure of cattle-owners into Government *rakhs* indicates a large increase of cattle, but though they may have to be stall-fed at some future time, it will always be possible to produce sufficient food for them on irrigated land.

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The grazing in the lower hill districts is partly local, partly pertains to the vast system of Himalayan grazing. Far away in Chamba, Bashahr, Kulu and Cashmere, and even in Spiti and Lahoul, every summer opens immense grazing-grounds of the richest pasture. The proprietory right of these is, as a rule, only claimed by the ruler of the country, and every comer may graze his cattle, sheep or goats for a small fee. The natural consequence of this is that people from all countries within reach of such pasture-grounds flock to them. Their herds increase rapidly under the most favourable conditions, and when winter begins to cover the rich pasture-land with snow, they have to retire from the Alpine regions to the winter grazing-grounds in the outlying hills, the areas in the interior valleys, which are not always even sufficient for the local herds being by far too cramped to receive them. The consequence is that large, and, it is feared, increasing, numbers of animals have tto be wintered in the lower hills of the Punjab, which certainly bear the traces of a long period of this annual inroad. This evil can only be alleviated by the creation of forest reserves and their strict closure.

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The higher hill forests suffer mostly from local herds which have been wintered in the upper valleys. These herds are not very extensive, and there is no fear but that the question with regard to them will gradually settle itself. By judicious management much has already been done in this respect in the Bashahr Division and the Bhandal valley in Chamba, and there is every reason to believe that in the rest of the country it will in time be settled as satisfactorily. In the most western and most eastern divisions of the Punjab, we are threatened by an inroad of Gujars. In Hazara this is due to our mismanagement immediately after completion of the Hazara Settlement. We allowed the villagers to enter our forests and graze their cattle in our reserves, and the villagers not requiring their own land leased their guzaras to Gujars. These nomads once admitted are difficult to get rid of, but during the last two years they have either retired or settled. In the Bashahr Division the Gujars approach by the Pubbar. The maximum number to be allowed into the forests of that valley was two years ago fixed at 500 head of buffaloes, but at present some 4,000 are said to graze within that valley. They have tried to sweep down into the Nogli and Behra valley as a route to new pastures; but luckily a belt of reserves extending from Hatta to Moral Peak lies straight across their way of ingress. The reservation of these areas is most popular with the people of the Nogli Behra and Sutlej valleys.

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The following information has been furnished regarding the area under wheat cultivation, and the probable outturn in the Native States under the Central India Agency, during the year 1881. The figures are founded on a rough estimate:—"In Gwalior, area 1,037,491 acres, outturn 4,407,894 maunds; in Bhopal, area 1,784,706 acres, outturn 6,585,160 maunds. For some of the States information is still wanting; in Baghelkhand, area 440,164 acres, outturn 1,321,432 maunds; in Bhopawar, area 157,589 acres, outturn 815,435 maunds; in Chaukhari, area 44,660 acres, outturn 256,573 maunds; in Goona, area 21,565 acres, outturn 155,832 maunds; and in Bundelkhand, area 184,220 acres, outturn 423,805 maunds. Information regarding the Western Malwa States is still wanting. From the statistics at present available, the total approximate area under wheat in the Central India States is therefore 3,670,398 acres, and the probable outturn, 13,966,131 maunds."

THE AGRICULTURAL COLLEGE AT CIRENCESTER.

With two or three young Bengalees amongst us, who have returned as successful graduates from the Agricultural College at Cirencester, the Lieutenant-Governor should not permit them to bury their talents in a napkin, as ordinary members of the Statutory Civil Service. Give them this status by all means, *but devote them to the purpose for which they were educated.* If we were Mr. Finucane, we could find we think, something better for these young gentlemen to do, than the outline grind of the Civil cutcherry. Send them out as lecturers on 'how to improve agriculture,' into the Mofussil towns and villages. There are but two or three of them we believe at present, while our administration is so nerveless that having trained and educated them, we are now puzzled what to do with them. Give each of them at once, a proper laboratory for the pursuit of agricultural chemistry, in connection with one or other of the great centres of our educational efforts, and set them to work upon qualitative analysis of all the staple products of the province, and of its soils. Require them to publish their analyses, and an account of their work, not in the official *Gazette*, but in the newspapers, or better in the *Indian Agriculturist*, the *Tea Planters' Gazette*, and the *Indian Planters' Gazette*. Give them respectable salaries to start with, not extravagant, but such as well educated and able young native gentlemen and scholars might reasonably expect. But above all *trust* them, and instead of putting them strictly under the Educational department, point out to them that their mission is to awaken the bucolic mind of Bengal, and that what you ask is that they address themselves to the task as earnest workers, adopting their own methods, and reporting at intervals with honest candour, exactly what they have done and are doing. We have seen two or three of these young gentlemen ourselves, and think very highly of them, and we are most averse to their being absorbed in the ordinary hum-drum ranks of the Statutory Civil service. If there is anything in them—and we certainly think there is—set them at once to work, as lecturers upon scientific and practical agriculture, giving each of them a laboratory, as we have said, at some great educational centre, where they might perhaps deliver a course of lectures twice a year. But *freedom* to them to choose their own methods of approach to the mind of the peasantry, is the first condition of all in our own eyes. Government cannot lay down rules for the conduct of such work, for it is of the *pioneer* order. We have spent a lot of money in the education of these young men, and they are back amongst us, with the 'hall mark' of academic success upon them. What we want them to do, is to administer a shock to the Indian peasant's mind, of the same order that our peripatetic lecturers gave to the minds of British farmers, forty years ago. The Lieutenant-Governor takes a wise interest in the new Agricultural Department he is organizing. Well, send these young men out as light horsemen, to make known everywhere what the Government hopes to accomplish. By their mixing freely with the people, and lecturing, with 'chemical illustrations,' before every audience they can get, they may do real work we believe in the mofussil. What does it matter if their first efforts fail? It will be easy—if these young men are what we think they are—to create a good deal of excitement and interest in their work, all over the Province. It is better that their connection with the Government should be as slight as possible, for the sake of giving them perfect freedom of method, and securing the ear of the people. To permit them, now that we have technically trained them, to be absorbed in the ordinary Civil Service, will be another of those mistakes we are constantly committing, through want of considering what we wish to accomplish by the money we spend.

We started the *Indian Agriculturist* ten years ago, for the purpose of making it a sort of centre, or focus, in which the public and the Government itself, might find a contemporaneous record of all that was being attempted in the way of improved agriculture all over the country. We never had any hope of making it an 'authority' upon Indian agriculture, but a Gazette in which every fact of interest connected with the ordinary agriculture of the country, and every experiment made, in the hope its improvement might be recorded for reference in years to come. There is no journal in India devoted to the ordinary agriculture of the country except this one. The planters have their Gazettes, very efficiently conducted, but 'planting enterprise' lies outside the scope of general agricultural improvement altogether. We have tried to induce the various Governments of the country to co-operate with us, in getting up a really valuable paper devoted to the improvement of the ordinary agriculture of the people, but have not had very much success as yet. With the advent of these young men from the Agricultural Colleges at home, something ought to be at last done.

FORESTRY IN SOUTHERN INDIA.[*]

We have received a copy of this book of 140 pages octavo. The author, from his long experience of Indian Forests, has a right to speak with authority on a subject which can never fail to be of interest to the Indian Government. Forestry in India has always held a prominent place in the economy of the land. It is a subject of so much importance, that nothing that tends to increase our knowledge in this direction should be lost sight of. Nearly everyone is alive to the great influence exercised by forest trees on the health and well-being of man, and the part that vegetation plays in the regulation of the seasons is perhaps not the least of its functions. Apart, however, from these considerations, it is essentially necessary that our Forest Officers, who come out generally with a training in the Forests of Germany, should have a hand-book to guide them in the satisfactory performance of their duties in India. A book in short that will furnish them with every information as far as possible. General Morgan rightly says that the duties required of a forest officer are multifarious. "To be really useful," he says, "he should know the language of the people, without which he is useless. . . . . In addition to the language, he must know the habits and customs of the people; then arboriculture in all its branches; next engineering and surveying, how to build houses and bridges, survey roads and blocks of forests, &c., run boundaries by a pick-axe trench. . . . Physic his people when ill, treat them with tact, attend to the health of his bullocks and elephants, . . . and keep his own health; answer endless letters, and understand accounts." General Morgan has produced an admirable little treatise on Indian Forestry, which will not only apply to Southern India, but we think to all parts of India. His remarks on the management of Teak Forests are fraught with singular practical knowledge come of long experience. At page 8 he refers to the unwise policy of constant change of appointments in these works: "A Forest Officer had no sooner established an understanding with the Collector and got things to work amicably, then there came another Collector, who had quite different views and ideas, and every thing went to ruin. One member of Council was in favour of shutting up the Anamallies, another was not, and so the matter went on until what ought to have been an admirable department storing up the sources of a large revenue for future years, became like a certain other department, not a saving department, but a spending one." These remarks apply with equal force to many other departments of Government, where a constant change of staff subverts the labours of the one immediately preceding. General Morgan's remarks (page 29) on the decline in the quality of Teak timber obtained from Pegu are worth noting. He ascribes the cause to "girdling."

The Sandal wood tree (*Santalum Album*) is treated of in a way that admits of no doubt. This tree is one of the most valuable we possess from a pecuniary point of view. It is much in demand in the China markets, and the price varies from three to six annas a pound.

The remarks on dry forests are full of instruction. Fires are looked upon as being both beneficial and injurious. "They render the jungle less pestiferous, and the grass comes up earlier, but fires ruin saplings, and should never be allowed in reserved forests." In his general remarks (page 40), the author makes the following trenchant observation: "What has already happened in Algeria threatens to occur here, unless speedy measures are taken to secure reserves, and save what yet remains of existing forests. Fire and cattle are worse even than ryots, and should be excluded. Perhaps when Collectors are Conservators, they will be able to use their authority to more effect than the Forest Department has been able to do. I quite agree . . . . that there is enough for all if it is properly conserved, but that is the difficulty. In vain does the Forest Department try to save the ryots from themselves, their improvident habits too surely destroy the jungles which ought to last them for centuries."

The book contains a list of useful Forest trees, with remarks for their proper cultivation and treatment, and concludes with the author's two prize essays on fuel plantations; humus and the defertilization of forest soils, etc., in India, and forest products.

The work is a practical guide for Forest Officers, and Government cannot do better than place a copy in the hands of every forest officer in the service.

TEA CULTIVATION IN CHINA.

It appears that the decrease in tea exports from China has awakened the tea merchants of Foochoo to a sense of their situation, and to the danger which threatens their tea trade at the present time. In view to improving the present unsatisfactory condition of things, the tea merchants of Foochoo—a place well-known as one of the principal ports in China for black teas—have addressed a circular letter to the various Chinese hongs and dealers, drawing their attention to the unsatisfactory condition of the foreign tea trade, which, it is pointed out, is due to the deterioration in quality that has of late years marked the teas exported from China. It reminds them of the serious decline in value in the London market of nearly every description of Foochoo tea, which in many cases amounts to fifty per cent. It goes on to say that during the last ten years India has gone on increasing her exports of tea, and improving its quality by greater care in cultivation and manufacture; and the tea growers of Foochoo are requested to evince more care and management with their trees. The authors of the circular seem keenly alive to the causes that have brought about the present low quality of much of the China teas recently exported. As a means of counteracting the evils complained of, they call upon all tea growers to follow the methods that should be adopted to secure a crop which will be good in quality, and fetch a good return in the London market. The method recommended is that tall trees should be pruned annually and reduced to low stature, and that 5 to 10 per cent of the old trees should be cut away annually, and these replaced by new ones. They should be well manured ; and, in picking the leaves, a distinction should be made between the old and the young. " Bean cake " is recommended as a good manure ; but before manuring, the old earth should be removed and replaced by new earth. By this means, the growers are told the color and taste of the leaves will be perfect.

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[*] "Forestry in Southern India," by Major-Genl. H. R. Morgan, late Deputy Conservator of Forests Madras. Edited by John Short, M.D. M.R.C.P. and S., F. L. S. etc., Retired Deputy Surgeon-General Madras Army. Higginbotham & Co., Madras.

With regard to plucking, to which much importance is attached, the following instructions (which are remarkable for force and clearness) are given :—

" The picking of the leaves should be promptly made according to the time, and the growers should by no means allow the time to pass without picking them. At the present moment, tea leaves in the Fuhkira province are usually picked after a lapse of three or four days beyond the proper time. This practice has an injurious effect, as the leaves cannot stand the temperature, hence the finest leaves become coarse. Those who wish their trees to produce the finest leaves, will do well to pick them according to proper time. This is a matter of vital importance. At the time of picking, the leaves should be divided into first, second, and middling qualities ; when this is done, they should be placed in separate baskets to prevent their mixing up. This practice was in vogue in former times. The leaves should be sieved several times, after which they should be divided into first, second, and middling qualities."

That the Chinese are becoming thoroughly alarmed at the threatened danger to their old industry, there cannot be the smallest doubt, and the issue of such a circular by the Chinese is a proof that the danger is real, and further that they seem determined to improve matters. Our Indian tea planters will do well to look to their laurels. India is marked out by the Chinese as their natural rival in tea, and we would invite the serious attention of tea planters to this matter. The methods adopted by the Chinese to secure a good crop may perhaps prove useful, and keep before their minds some very useful hints which, perhaps, do not always occur to them at the proper time.

THE JUTE INDUSTRY IN GERMANY.

Consul General Vogeler has just issued a most interesting and comprehensive report on the jute industry in Germany. Much attention is being devoted in that country to extending a business which, during the last few years, has developed to large proportions. Referring to the plant, he says, " the principal requisite for its cultivation is a moist, warm climate ; given such a climate, it will thrive almost equally well in the low lands and on the plateau." Of course, there being no plateau land in Bengal, which has been successfully cultivated with jute, we have no means of ascertaining the correctness of the opinion, but there are certain other conditions necessary for the growth of the plant. Although it luxuriates in a hot damp climate, there should not be too much rain, especially in the early part of the season ; in exceptionally dry seasons we frequently find crops standing through the cold season which the cultivator did not regard as worth cutting. It is almost unprofitable to cultivate jute upon laterite and open gravelly soil, but it will thrive upon a loamy soil or rich clay and sand. The finer qualities are produced upon the higher lands, known to the ryot as *sunn*, adjoining their homesteads upon which the *aus* paddy, pulses and tobacco are planted in rotation. The coarser qualities are grown principally upon *churs* or mud banks and small islands on rivers. The soil is prepared at different times according to the position of the land ; if it is low-lying and there is apprehension of early flooding, it must be ploughed earlier than higher lands. The more clay in the land, the oftener it is ploughed before sowing. In the former case the land is prepared in November and December, and in the latter in February and March. The soil is ploughed from four to six times, the clods are reduced to powder, and at the final ploughing, the weeds are collected, dried, and burned. The sowings commence according to the position of the soil about the middle of March and extend to the end of June. General Vogeler says :—" The amount of seed required is from 20 to 30lbs. to the acre. Cutting commences from 12 to 15 weeks after sowing. The plant reaches a height of 10 or 12 feet. The average yield of fibre is 2,000lbs. per acre." The seed is seldom purchased. The cultivators allow a number of plants in a corner of the field to ripen into seed, and these are used the following year. In the matter of outturn, however, it is difficult to make an assertion authoritatively, or with any degree of accuracy. As the crop is entirely dependent upon the season, it varies considerably ; sometimes the yield of fibre per bigah is 5 maunds, at others it rises to 10 or 12 maunds, while in some parts of the country the average crop is 1 to 2 or 3 maunds. The plant is cut when blossoms appear on it, and past season when the fruits appear. In the former stage the fibre is a little weaker than the other, but it is finer and has a gloss which recommends it to the purchaser. The fibre is separated from the stalk by a process which is known as retting. In this connexion M. Vogeler says :—" Flowing water is preferable because it bleaches the fibre, making it almost perfectly white, but the process of separation is quicker in standing water." Here his information is at fault. It is true in some districts bundles of jute stems are submerged in rivers close to the bank, but there is some danger attending this process. The river is at this season of the year very high, and the current strong ; if the palings with which the bundles are secured to the earth are removed, the entire quantity will be washed away. It is therefore a common practice to steep them in tanks and stagnant pools, and place weights on them to make them sink below the surface of the water. " The period of retting," says an Indian writer, " depends upon the nature of the water, the kind of fibre, and condition of the atmosphere. It varies from two to twenty-five days. The operator has therefore to visit the tank daily, and ascertain, by means of his nail, if the fibre has begun to separate from the stem. This period must not be exceeded, otherwise the fibre becomes rotten and almost useless for commercial purposes." The following interesting account of the way in which the fibre is separated from the stalk is taken from Royle's *Fibrous Plants*. The operator having taken his stand in the water up to the waist begins " to remove small portions of the bark from the ends next the roots, and grasping them together, he strips off the whole with a little management from end to end without breaking either stem or fibre. Having brought a certain quantity into this half-prepared state, he next proceeds to wash off ; this is done by taking a large handful, swinging it round his head, he dashes it rapidly against the surface of the water and draws it towards him, so as to wash off the impurities ; then, with a dexterous throw, he spreads it out on the surface of the water and carefully picks off all remaining black spots. It is now wrung out so as to remove as much water as is possible, and then hung up on lines prepared on the spot, to dry in the sun." It must not, however, be supposed that as a rule the bundles are stacked in water immediately after being cut. In some parts of the country they are allowed to remain where they are cut for the leaves to decay, as the latter are supposed to discolour the fibre in the retting process. However this may be, it is supposed that the fibre is benefitted in this process, since it is found to separate more easily from the stems and runs no risk of rotting by over-maceration. The Consul-General is a little unfortunate in the figures he quotes. He says—" The export from Calcutta . . . . . . now amounts to 8,000,000 cwts. per year. About one-tenth of this amount is imported into Germany." Now referring to the annual statement of trade and navigation for 1881-82, we find that the total amount exported amounted to 7,510,314 cwts., of which Germany absorbed 33,804 cwts. only. This is the smallest quantity taken by any country in the world with a rising industry. Even Egypt consumes almost a thousand cwts. more than Germany. As a matter of course, the United Kingdom take the lead with 5,687,584 cwts., then comes the United States with 1,431,014 cwts., next France, 141,181 cwts., Austria 105,540 cwts., Italy 82,308 cwts. The process employed to manufacture jute products is similar to that employed in the manufacture of linen and cotton goods, but productive of less dust, and hence is less detrimental to the health of the workmen. The process of bleaching jute has not yet reached that point of perfection at which it may be performed without lessening the strength of the fabric. A great many fabrics are already being made out of jute. In addition to carpets and table covers, a new material called "jute velvet," adapted for furniture coverings, curtains, and wall hangings, is rapidly coming into popular favour. The body of the velvet consists of cotton, and the pile is made of jute. This pile is produced like other velvet piles, and by a simple process designs can be pressed into it according to the nature of the use for which it is intended. This jute velvet is very durable, and not liable to be injured by moths.

In Germany the jute industry is about sixteen years old. The first factory was established at Vechelde, near Brunswick. in the year 1868; since then others have sprung up in Hanover, Oldenburg, Bremen, Gera, Meissen, Potsdam, and lately in Berlin. It is estimated that at present this industry is represented in Germany by about 50,000 spindles and 4,000 looms.

It is claimed that the products of these German jute factories are in no way inferior to those of Scotland. The production of German jute mills last year amounted to about 70, 000,000 lbs., which is estimated to have supplied about three-fifths of the home demand.

Miscellaneous Items.

THE Metropolitan Horse Fair will take place at Rawul Pindee this year as usual.

ON account of the Rawul Pindee Assemblage, the Lahore Horse Fair, which was to have been held on the 27th instant, has been put off to the 6th proximo.

DURING the month of January, 240,515 cwts. of wheat, valued at Rs. 9,13,608, were shipped from ports in Sind.

ACCORDING to the latest report, the season has been a favourable one for the opium crop in the N.-W. and Oudh Provinces, and the collection of opium has begun in several districts.

ON the representation of Messrs. Wilson and Darrah, the Government of the North-West Provinces and Oudh have placed at the disposal of the Agricultural Department a sum of Rs. 10,000 for the formation of fuel and fodder reserves.

A CORRESPONDENT says:—"*Mikania guaco*, a composite plant of South America, is an antidote to snake-bites. A tincture is made by infusing the leaves. The infusion is drunk, and the hot leaves are applied in the form of a poultice to the bite."

THE crop and weather report, as regards the Oudh districts, shows that the increasing heat is being generally felt. The wind is strong from the west, peas are being cut in places, opium extracting is in progress, prices are steady, supplies abundant, and the general health good.

A MEERUT correspondent telegraphs that the Nauchande Fair was opened by the Duke of Connaught, and promises to be a great success. An immense concourse of people have assembled. Cattle and horses and various wares have been brought to the fair in great numbers

IT having been fully demonstrated that it is hopeless for a native plough to compete with any chance of success against a mould-board plough, working for the same time on an equal area of the same kind of land, the Madras authorities have decided to open separate competitions for native ploughs only. A stronger proof of the inefficiency of the native implement could hardly be afforded.

THE late Earl of Lauderdale's wine was sold at Edinburgh a few days ago. The great specialty was some sixty dozens of 1820 Madeira, *bottled 1844, with the following label in the cellar book; "This wine went out to India and China with Captain Sir Thomas Maitland."* There were also six dozens Madeira of fabulous age, labelled "Brought home by Sir A. Maitland, from West Indies, in the *Pique* frigate."

THE cry now all over Bangalore is—"Where are we to get our water if the rains hold off? Sumpangy tank, dry; Miller's basin, with only a month's supply; Ulsur subsidiary reservoir, dry; Ulsur tank, barely two months' supply; Shoolay tank, dry; and all smaller goontas completely parched. Where are we to look for the precious element! If some of our energetic members of the Municipal Board, instead of wasting public money on dispensaries and police wards, which are certainly useful works in their way, would give way to the more urgent need of providing water to meet the impending scarcity, by sinking ordinary pot wells in likely localities, we believe that much good could be done. A well of this kind, 50 feet deep, costs 25 rupees, so that several hundred of these might be sunk all over Bangalore, for the sum proposed to be spent on either the new Ward, Bowring Hospital, or the Ulsur Dispensary."

THIS season's *kheddah* operations in the Garo Hills have so far been most successful. Between the 7th January and the end of last month, Mr. Sanderson and his party had succeeded in netting 161 wild elephants. Operations were still proceeding when the last report was received. The relative importance of the enterprise in the Garo Hills is shown by the fact that the recent extensive operations in Dehra Doon only resulted in the capture of 36 live animals.

AN official return of the sales of sandal-wood in Coorg for the past five years shows that 100½ tons of the wood were sold on an average each year at the rate of Rs. 343 per ton. The largest quantity was sold in 1882-83, when 192¼ tons were disposed of, and the smallest quantity was sold in 1883 84, when only 36¼ tons were sold. The highest price was also realised in 1882 83, when the wood brought Rs. 402 per ton; the lowest price realised Rs. 231 per ton in the year 1881-82.

THE latest reports from the indigo districts in Behar are generally favourable. Sowings are now nearly completed, and the plant is reported to be looking very healthy, whilst the late re-sowings are also coming on well. In one or two factories in Monghyr and Chupra the young plant is said to have suffered from the west winds and irrigation has become necessary. Throughout Lower Bengal the plant is much in want of rain, but, considering the weather, it is doing well.

EXPERIMENTS are being made, according to the *Polytechnische Notizblatt*, in Paris with a new alloy having a white color, yet containing no nickel. It is said to be very strong and malleable. It is made of copper and ferro-manganese, the proportions being varied according to the purpose for which the alloy is to be employed. An alloy of forty parts of copper and sixty parts of ferromanganese with a suitable quantity of some appropriate flux produces a metal of such tenacity that it surpasses the best steel armour plates.

THE *Surat Akhbar* says that the Bombay Government has at last done justice to fishermen, who were hitherto unable to obtain and use one-fourth of the quantity of salt necessary for salting fish. The result was that a fisherman sold unsalted, and often putrid fish to the people. In consequence of this, Government have directed that salt depôts should be opened on the shores of Bulsar and other places inhabited by fishermen, whence salt will be supplied them for fish-salting purposes without any, or at comparatively low duty.

THE Blue Mountain Range in New South Wales is much frequented by fern-hunters, especially in the vicinity of Mount Wilson where the summit of the ridge is largely covered with a dense growth of eucalypti, the mere trunks of which almost obscure the horizon, and in the undergrowth it is no exaggeration to say that thousands of tree-ferns, ranging up to 30 feet in height, are visible in every direction. It is on the southern slopes that the sassafras is found, in which mosses and orchids luxuriate, and festus or lianas hang from the topmost branches.

THE serious losses that Queensland pastoralists have experienced from the severe drought of the last 18 months were illustrated in the half-yearly report of the Squatting Investment Company, submitted to the shareholders last month. Although the Company went extensively into tank sinking immediately after purchasing their property, it was too late, and for 18 months there has not been sufficient rain to put any water in the tanks. The Company has lost over 100,000 sheep in 18 months, although its property is said to be one of the finest stations in Australia.

BESIDES the unusual pressure caused by the camp at Rawul Pindee, the Sindh, Punjab, and Delhi line will have an extra strain on its traffic owing to the Hurdwar Fair, which is expected to be on a very large scale, owing to the Koomb which recurs every six years. The fair does not commence till the 13th April, but the pilgrims from the Punjab are already pouring into Hurdwar. The East Indian and Rajpootana lines will also have to run specials to meet the extra traffic for Saharunpore. It is hoped that the branch line from the latter station to Hurdwar will be ready for traffic by the end of the month.

LANTANA, called the planters' curse in Coorg, does not appear to be so black as it is painted It is remarked of this plant that its growth in Coorg is very vigorous, and the spread of lantana in the Attur Forest close to Fraserpett is said to be truly wonderful, and may be expected in time to improve the character of this forest; while in and about Mercara the growth of young forest trees under the shelter of the lantana is most marked. At present, therefore, the spread of the lantana has its value by making the forest impenetrable, and leads to the hope that it may enrich the soil of abandoned estates which may be overgrown with it.

THE enquiry instituted by the Department of Revenue, Settlement, and Agriculture, last month, regarding the alleged influence of the Erythrina Indica (Dadap or Indian coral tree), in producing leaf disease when planted for shade among coffee trees has, according to Mr. W. Wilson, the Director of the Department, elicited replies from several gentlemen well qualified by their practical knowledge to speak with authority on the subject, to the effect that there has not been observed in southern India any connection between the presence of Erythrina trees and the production of leaf disease, but that on the contrary the effect of planting Erythrina has been distinctly beneficial, not hurtful, to the coffee trees which it is planted to shade. The replies given are in complete accord on the point.

An attempt is about to be made in the N.-W. Provinces to secure protection for the cattle in time of scarcity, and to benefit agriculture generally by organising, through Government agency, fuel and fodder reserves. A scheme has been prepared and submitted to Government by Mr. Wilson and Mr. Darrah, on the receipt of which the Local Government placed a grant of Rs. 10,000 at the disposal of the Agricultural Department for the formation of fuel reserves in the Alighur district. Suitable plots in the district have already been selected, marked out and surveyed, and an application will soon be made to Government for their utilisation.

North Borneo bids fair in the future to rival Singapore in the timber trade. At present the barque *Ellen* is loading a cargo there for one of the Australian ports, and this is the second large shipment to the Colonies, a former one having been made by steamer. The wood shipped is something similar to our serayah, and it is expected that a large trade with Australia will in time spring up. It appears that in all countries a soft easily worked wood is the most useful, but there are, besides, many fine kinds of hard timber in the North Borneo forests, some of which cannot be excellent in any part of the world.

The following extraordinary statement is from the *Electrician* of the 7th February :—"A new process was recently tried in America for sugar refining, in which the principal agent employed is electricity. The cost is said to be not more than 3s. 4d. per ton, and the result a hard sugar of almost absolute purity without any syrup whatever." As the cost of refining under the present remelting processes varies from £3 to £5 per ton, the above alleged discovery would be a startling one if it were true ; possibly the cost of electrical refining should be given as 3s. 4d. per *cwt.*, and not per *ton*. Sugar refining at a cost of 2d. per cwt. appears far too good to be true.

Sir Samuel Baker recommended a new product when he called at Colombo. He said to the representative of the *Ceylon Observer* : "When I was in Japan about two years ago, I sent to my relatives at Nuwara Eliya (Ceylon) a large quantity of the seed of the lacquer plant, and Mrs. Baker told me she has got a lot of young plants from the seeds. It struck me that this might be a new product worth growing. I am sure Mrs. Baker would be very happy to give any information on the subject. I was the first to introduce it into England. I have got large quantities in my garden. It should grow beautifully on the hills here, much better than it grows in England. It is a very valuable plant : in Japan it is considered of great value."

The Dhurumsey Mill, Bombay, has at last been closed for want of funds. This mill stands third in the world, and is the largest in the whole of India. The cloth it manufactures is considered good ; but it seems to have seen the light under an evil star, for all who have ever been connected with it have been ruined. Since the time of Dhurumsey Poonjabhoy it was a white elephant in the hands of the Pandays. The shares, originally worth Rs. 2,000, are now unsaleable at Rs. 150. By the closing of the mills about twelve thousand workmen have been thrown out of employment. We understand that the two chief creditors of the mill, Messers. Gocouldas Madhowjee and Kesowjee Jadowjee, have some dispute with the agents, who have no funds in hand for the working of the mills.

We hear that the Kumaon Iron Works Company is extinct. Some of our readers will remember that this Company was first established in 1860, with capital largely supplied by persons connected with Kumaon and the vicinity, and that at the time great expectations were entertained of large profits from iron-working. The capital was much too small, and was soon spent, and the works were suspended for many years. The shareholders, after many ineffectual attempts to raise fresh capital and to establish claims upon the Government for reimbursement of money invested, have at last agreed to accept an offer by the Secretary of State to take over all the works, upon payment to the Company of about Rs. 37,000, in full satisfaction of all claims. This sum will be distributed *pro rata* among the shareholders.

Messrs. Gill, Deane & Co., of Guntur, write :—"We had a good crop both as to quantity and quality and good prices, but the encouragement given by some buyers to adulteration, and upon which subject we have continually reported, since our circular of 14th November 1884, has culminated in such a state of affairs that should give those who are responsible for it, very good reason to remember this season as a warning in future. What little publicity we have afforded to those malpractices appears to have been unheeded, but we can add now that if the same buyers receive any fresh help from Madras, Guntur business had better be abandoned. We have done what we can to remedy the evil by attempts at joint action locally, but when the time came, those who joined us had not the courage to maintain their promises."

A curious cattle-disease has made its appearance in the You Yangs district in the colony of Victoria. An Australian paper says :—"Mr. Kendall, veterinary surgeon, has furnished a report to the Government on the cattle-disease in the You Yangs district. The report states that during the past four years, since the disease broke out, 700 or 800 cattle altogether have died of it. In the digestive organs of the dead animals considerable quantities of rabbit-bones were found, which Mr. Kendall has no hesitation in pronouncing form anthrax or blood-poisoning. The predisposing cause of this is the bad quality of the water, and the fact that the alkalis which the water contains give animals a depraved taste for chewing animals' bones. The blood of the animals was observed to contain bacilli, not in large numbers, and bacteria were discovered in the water that the animals drank."

A meeting of the members of the Bombay Millowners' Association and others interested in the mill industry was held last week, to consider the advisability of closing the mills two days in the week, in view of the present depressed state of the market. Mr. Jehangeer Hormusjee moved a formal proposition to this effect, and it was seconded by the chairman, Mr. Dinshaw M. Petit, who observed that a reduction in the production of yarn and piece-goods would tend to an increase in the price. Mr. George Cotton said that he, having carefully considered the question in conjunction with his co-directors, had arrived at the conclusion that the proposal before them, if carried out, would effect an increase in the cost of production, and would make the small margin of profit which they now obtained, smaller still. After a good deal of desultory conversation, the original proposition was withdrawn in favour of one moved by Mr. Cotton, to the effect that it would be to the advantage of the industry if the mills were closed one day in seven, exclusive of holidays, from the 1st of April to the end of the year. The proposition, having been seconded by Mr. Pearson, was carried unanimously.

Selections.

ENSILAGE.

Mr. David M'Queen, Wishaw Estate Office, favours us with the following :—

At first, like many others, and many still, I was somewhat sceptical about the fact of being able to preserve grass in a sufficiently wholesome state for cattle to eat without producing results detrimental to their health. But now that I have been thoroughly convinced from practical experience of the utility of silage, I am anxious to impress upon those engaged in the rearing and feeding of cattle the propriety of its adoption, as there cannot be the slightest doubt about its usefulness as an article of food for cattle, being both wholesome and nutritious. There is this, furthermore, in its favour, and which is a most important point, its adaptability to the climate of this country. The grass can be cut and ensiled in any kind of weather, no matter whether it be wet or dry. And there is still another very important recommendation—you can produce about four times the weight of ensilage that you can do of the same quality of grass made into hay.

The silo from which I obtained my experience was at one time an ice-house, but it has not been used as such for many years It is built of solid masonry, on the upper edge of a sloping bank, and there is an opening in the upper surface of the ground, which was used for passing the blocks of ice through, and suited admirably for depositing the grass in the same manner. The lower opening, or passage, has two doors, an outer and inner, and is intended to prevent the ingress of air. The silo was filled at five different times. The first, on the 25th of June, was composed of short grass cut from the bowling green ; the second, on the 26th of June, of plantation grass ; the third, on the 3rd of July, of plantation grass also ; the fourth, on the 8th of July, of meadow grass ; and the fifth, on the 17th of July, of half-made hay cut from the policy grounds. The grass put in on each occasion was covered over with planking, and weighted immediately afterwards with about 26 lbs. to the square foot, and on the 5th of August the weight was increased to 80 lbs. per square foot, and the inner door of the passage on the side of the house hermetically sealed. These grasses, I may state, with the exception of the meadow grass, were formerly used almost entirely as bedding.

No salt was used with the grass when put into the silo. The silo remained in that condition until it was opened on the 16th of last month. When the weights and planking were removed it was found that the ensilage, to the depth of 6 inches on the top, was moulded, but even that the Galloway cattle readily partook of, although only put into their shed as bedding. The quality of the ensilage underlying the 6 inches or so of moulded stuff on the top is in splendid condition, and over forty cattle are being fed with a quantity of it twice daily, and one and all of them take it with great relish. I may likewise state that park deer have also had a trial of it, and although, when they felt the smell of it, they retreated rapidly, still a short time after there was not a vestige of it to be seen.

I have not been able to make any comparative test of the feeding qualities of ensilage as against any other kind of feeding for cattle, but of this I am convinced, it must be greatly superior to having the grass in the form of hay, as it must retain the most of the nutritive juices in the grass that in the process of hay-making evaporates.

I hope to hear of some inexpensive plan of silo being adopted, and so enable farmers to take the full advantage of the grass grown upon many farms, the making of which into hay our climatic changes frequently render an impossibility.—*North British Agriculturist.*

FISH AND FISHERIES IN THE UNITED STATES.

We have so recently referred at length to the activity and usefulness of the United States Commission of Fish and Fisheries, that we must be content on this occasion to direct attention to the appearance of another of the valuable and interesting reports issued by Prof. Bird. The volume before us extends over 1,200 pages, and is, where necessary, illustrated by lithographic plates or maps. An account is given of the new schooner-rigged vessel, appropriately called the *Fish Hawk*, which has been built for the special work of the Commission. Its three trips to the inner edge of the Gulf Stream slope resulted, we are told, in the discovery of a new and exceedingly rich marine fauna, "quite excelling anything hitherto encountered by the Fish Commission off the New England coast...... The bottom appeared to be nearly continuously covered with life, as the dredge and trawl seldom came to the surface without a load of interesting forms, demonstrating that the region was eminently well fitted as a feeding ground for fish, of which several edible species were taken by the *Fish Hawk*." During the year 1881 the "unprecedentedly large yield" of seventy millions of young shad was obtained, which was distributed by the officers of the Commission among the various hatcheries and eighteen States of the Union; this increase by more than 100 per cent is regarded as being due not only to the favourable fishing season, but also to the increased efficiency of the methods and apparatus of the Commission. As we turn over the pages of this volume, we observe much that we should like to quote or upon which we might expatiate, and we know that we should interest the naturalist as well as the fishery economist; but considerations of space forbid, and we must content ourselves with saying that we have here yet another monument to the energy of Prof. Baird, and to the wise action of a legislature which is now devoting a sum of no less than 70,000*l*. a year to the work of the Fish Commission. If the things in the sea that interest the British naturalist are things with which a British Government feels it can have no concern, is the same true of those things that might need a nation such as ours? When some are calling out that the state of our navy threatens us with a loss of external supplies of food in case of war, others among us are, it is to be remembered, feeling at this moment the want of a more plentiful supply of more nourishing food. It is for statesmen to decide on the value of considerations which it is the duty of the naturalist to submit, but the naturalist, entitled to have an opinion, watches with admiration the beneficent activity of the officers of the United States.—*Athenæum*.

ENAMEL FOR METALS.

The following is said to form a good enamel for cast iron, wrought iron, or steel, and we are informed that it will not crack on being subjected to moderate changes of temperature. When an opaque enamel is required, let us suppose, as a basis for vitrified photographs, about 8 parts of oxide of tin should be added. Take about 125 parts (by weight) of ordinary flint glass fragments, 20 parts of carbonate of soda, and 12 parts of boracic acid, and melt. Pour the fused mass out on some cold surface as of stone or metal, and pulverize when cooled off. Make a mixture of this powder with silicate of soda of 50 B. With this coat the metal to be glazed, and heat in a muffle or other furnace until it is fused.

MAKING IT PLEASANT FOR THE HORSE.

Mr. Torreyson, the blacksmith of this city, is noted for his kindness toward animals. He has just built a road-cart, now on exhibition at his blacksmith shop, which is destined to revolutionize travelling by road, and to materially lighten the labor of that noble animal, the horse. The idea is to occasionally give the horse a chance to ride in the cart as the driver. The idea was first suggested to Mr. Torreyson by seeing a turtle move along the road carrying his shell with him. The vehicle made by Mr. Torreyson has four high wheels and the place between them is arched, so that the horse is hitched under the waggon between the wheels, his head projecting a little beyond the front wheels and his tail justly barely clearing the hind wheels. The driver sits just over the horse's neck and the others in the waggon face outward on each side. The horse is so fastened that the pulling is distributed over his body, and does not all come on his neck and shoulders. In this position he is greatly protected from the sun and storm, and thereby enabled to make long journeys with less fatigue.

But the principal part of the invention lies in a belly band about four feet wide passing under the horse. When you reach the top of a long hill, down which the horse would have to go slowly as he held back the load, you simply turn a crank, and it lifts the horse off his foot several inches from the ground, and the vehicle then runs down the hill of its own momentum. It is provided with a steering apparatus and a brake, that the vehicle may be steered and its velocity regulated.

Several times during the day the tired horse has a chance to ride, and is very much rested. Also when the horse attempts to run away, you wind up the crank, and he is lifted off the ground perfectly helpless.—*News Times*.

GERMAN SUGAR BOUNTIES.

The following official returns of the Sugar trade of the German Empire are summarised from the *Journal des Fabricants de Sucre*. They put, in a striking tabular form, the rapid and vast increase in the production, the miserably small character of the home consumption, and the progressive decrease in the Sugar revenue, at a time when it ought to have been increasing by leaps and bounds, if the Germans were not debarred by mistaken laws from using their own Sugar. Instead of that, they are actually paying foreigners to use it. The net Sugar revenue in 1871-2 was £ ,306,719 on a consumption of 221,793 tons. In 1883 4 the consumption was 349,671 tons, which, at £9 per ton, the German rate of duty, ought to have yielded a revenue of £3,147,039, instead of which the yield was only £1,755,863. The difference of £1,391,176 represents the increased export bounty, or, in other words, the sum paid by the German taxpayers to foreigners to induce them to use Sugar which in a natural state of things would have been used at home. This represents an average export bounty of 2*s*. 4*d*. per cwt. on the extra quantity exported in the time, a rate which in the current season of 1884-5 is expected to reach 2*s*. 6*d*. per cwt. Beyond this loss to the German taxpayer, the German producers of Sugar are understood to have lost £1,000,000 or £2,000,000 in the present season, in consequence of the production, artificially stimulated by Government, of a commodity which the tax will not allow to be used at home. Further, the German consumption, if Sugar were duty-free, ought far to exceed ours, so that there is a remunerative opening at home for 1,500,000 tons of Sugar a year, when the ordinary laws of supply and demand are allowed fair play. Instead of this, the German consumers have to pay quite 50 per cent more for bad Sugar than we pay for their own good Sugar. A more melancholy example of blindness to the truths of political economy it would be hard to find.—*Produce Markets' Review*.

HOW TO USE WHEATMEAL.

By A. L. F.

For many years back doctors and sanitary reformers have been urging the public to use meal made from the whole wheat instead of so much fine white flour. Their arguments are convincing, their reasoning sound, so masculine wisdom whispers to the house-mother to try wheatmeal porridge. The good woman accedes, buys some wheatmeal and proceeds in the approved fashion just as she would for oatmeal porridge, and produces—like Tom Hood's schoolmistress—paste. At least, such is the juvenile comment at the breakfast-table—"Oh, ma, I don't like this." Papa says, "Nonsense, children; it's good for you." He does not relish it much himself, but it was his recommendation, and so he must stand by it. However, after a few mornings, the novel dish disappears from the scene, and wheatmeal porridge is silently, but none the less certainly, pronounced a failure. I speak feelingly, for this has been my own experience, and I feel sure that it has been that of many others. But those days are past. It is now possible to obtain wheatmeal specially prepared for making porridge and gruel. It is nicer than oatmeal, sweeter and more delicate, and is in summer a less heating article of diet.

To keep us strong and well we need three kinds of food; food to keep us warm, food to build up our bodies and sundry mineral matters, such as phosphates, to make our bones firm and hard and nourish our brains, iron to make good blood, and so on. Now, all these are found in wheat. A grain of wheat under the microscope is seen to consist of a central white mass which is nearly all starch or heat-giving food. This is surrounded by darker layers which contain the gluten or flesh-forming substance, also the phosphorus and iron. And Nature, that wonderful chemist, has even enclosed in those little cells a substance called crealin, which has the power of partially digesting the starch. To make a fine white flower a large portion of these valuable constituents are left out and carried off in the pollard and bran, with the result that we have to make up for the lost nutriment by eating more meat, while the fine, starchy flour produces constipation, and even, according to some medical men, acts as a fruitful source of the dreaded disease, diabetes.

Practically, housewives will find there are two kinds of wheatmeal—one produced either by the old process of grinding between two circular stones, of which the under one is fixed, while the upper one moves; or very finely-ground by steel rollers. This is known in the trade as wheatmeal flour, and is in appearance like rather a dark flour with flakes of bran scattered through it. It is suitable for baking, and is manufactured by, I think, all the Melbourne mills. I may mention Messrs. Swallow and Ariell and Messrs. Gillespie and Co., as to makers whose meal I have often used and always found satisfactory. For bread and scones nothing can be nicer, and a handful added to the flour when you are making a meat-pie or any kind of suet-crust, even for roly-poly or apple pudding, is generally thought an improvement by those who have tried it.

As porridge, however, it is an utter failure, most difficult to prepare without burning, and, at best, very unpalatable. I do not think any one could ever learn to like it. Yet wheatmeal porridge may be a delicious dish, fit for a prince; but before you try to make it, ask your grocer for "granulated wheatmeal." It is very like fine oatmeal, having, indeed, been treated in a very similar manner. Like oatmeal, it is kiln-dried previous to grinding. This process reduces the amount of moisture, and so far renders the meal more economical to the consumer, and, besides, makes the wheat crisp, so that the scarf-skin, or outer woody layer of coarse bran, is

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Weather Report.

[BY TELEGRAPH.]

SIMLA, April 9.

Deficient reports have been received from Madras, and none from west Punjab. The barometer has risen, with a few local exceptions, chiefly in Hazaribagh and Goa. The two low-pressure areas still exist, but that over the Gangetic plain is less marked to-day. Pressure is highest on the Eastern coast. North-westerly winds prevail north of Bengal and Assam ; South-easterly winds in Madras and Vizagapatam, and variable elsewhere. Fresh winds at False Point and Saugor Island, and in Goa light generally. Skies are overcast at Darjeeling. It is somewhat cloudy in the Punjab, Western districts and the N. W. P. clear ; elsewhere the air is much drier. In Behar, Central Provinces, and Chota Nagpore the temperature has fallen ; in the Western parts, N.-W.-P., and parts of Madras, Cuttack, and Dhubri, it has risen generally. Thunder and dust-storms with rain and hail have occurred in the N.-W. P. Rain to-day—at Cuttack and Secunderabad 1 inch, and Allahabad and Agra ½ inch.

Editorial Notes.

Mr. J. A. Bauer states that he finds quicksilver to be a perfect preventive of phylloxera. The quicksilver is finely comminuted with a dry clay, so that no globules of the metal can be detected by a magnifying glass ; this is added to the soil around the roots of the vine, half an ounce of mercury being the proper quantity to be applied to each vine. The cost of treating an extensive vineyard by this process would therefore be considerable.

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A contemporary, having been asked whether "smut' grows on wheat and whether placing the seed wheat in brine will prevent the disease, says that are three diseases common to wheat which look much alike—*Uredo caries* usually known as "blight," "bunt," or "brand"—in this disease the interior of the grain is filled with spores of disagreeable odor. Pickling is resorted to in order to kill the germs of this variety of fungus. One pound of cupric sulphate (blue vitriol) is allowed to every four bushels of seed, dissolved in sufficient water to wet all the grain in turning ; *Uredo segetum*, "blackhead," or "smut"—Grain is converted into a mass of black spores, but these wash off before harvest and do not injure the sample ; *Puccinia graminus*, "mould," or "mildew"—it is now placed beyond doubt that this is one stage in the life-history of the fungus, of h the "barberry blight" (æcidium berberidis) is another. pears on the leaves of the barberry as the yellow spots n as "cluster cups," and the "rust" (*trichobasis rubigo vera*) is another. It is most common in moist seasons and on rank crops. All barberry plants should be taken out of hedges, etc., so as to reduce the chance of propagation. Brine is of comparatively little value ; at least by practical test we could find no benefit accruing from its use. Sulphate of copper (blue stone) is, however, almost a specific.

The following is the substance of an address delivered by Sir J. B. Lawes, on the rotation of crops, at an adjourned discussion on the Rothamsted experiment at the Newcastle Farmers' Club meeting :—Looking at agriculture from the point of view of a chemist only, there is nothing more puzzling than the fact that a wheat crop, following a crop of clover which has been twice mown for hay, may be as large as the wheat following the clover fed upon the land. The hay contained sufficient manure ingredients to grow several crops of wheat, while the sheep feeding on the clover returned to the land by far the larger amount of these manure ingredients. The two portions of the field must, therefore, be in different degrees of fertility. Why, then, should not the crops of wheat also be different ? The only possible explanation must be either that the season will not permit of a larger crop being grown, or that the manure deposited by the sheep had entered into some insoluble compounds with the soil, and had not yet assumed that active form which could influence growth of the wheat. It is quite probable that the nitrogen removed in the clover hay would amount to 100 lbs. per acre. We have only to consider what would be the effect of applying 600 lbs. nitrate of soda per acre to the wheat, to satisfy ourselves how inactive the manure from the sheep must be. The object of these remarks is to show that in all cases where animal and vegetable manures are employed on the land, they enter into various combinations with the soil ; some becoming the food of plants in short periods of time, while others only become available after long periods have elapsed. It would also appear to be almost certain that while some portion of such manures becomes the food of one class of plants, others can only be recovered when a different class of plants are grown. In our rotation experiment at Rothamsted, twenty-four years elapsed between the two clover crops. Every four years the root crop was manured with 2,000 lbs. of rape cake, phosphates, potash, and ammonia, and the whole of the bulbs and leaves were carried away, as well as the wheat, barley, and beans ; in fact we did everything in our power to get out of the land the whole of the manure that we had put in. Our efforts, however, were not crowned with success, and a clover crop grown at the end of the 21st season, with a second clover crop grown eight years afterwards, revealed to us what a mass of fertility had accumulated in the soil, which neither the wheat, barley, beans, or roots could get hold of Eight tons of clover hay per acre was taken off in the two years. It is evident that the ingredients taken up by the clover could not be food for the other crops, as the wheat after the clover was better than the wheat after the fallow where no clover was grown, and it is absolutely certain that upon the land—which grows wheat, barley, and roots with a fallow instead of clover—the manure ingredients have largely accumulated, and will continue to accumulate until some deep-rooted leguminous plant such as red clover, sainfoin, or lucerne, taps the mine. That these accumulations are in a great measure due to the manure used, is quite evident from the fact that upon the unmanured land very much smaller crops were obtained ; we are not yet, however, in a position to explain the exact nature of the accumulations. We have recently carried our analysis of the soil of this field to the depth of nine feet. The ingredients, however, which we are in search of—although large and of great importance in a crop of clover—are apparently of too minute a nature for us to detect when spread over the area of an acre of land nine feet in depth and weighing about 36 million lbs. Whatever the explanation may be, we have the fact that a rotation of crops is an economical process for using up the ingredients found in the soil, as well as those applied in manures. If, then, we assign to the leguminous plants the office of collecting and utilising waste products, we may call the cereal crops the great consumers and wasters of nitric acid, as a certain amount of weeds always grows up under the protection of the corn crops. It is part of the function of a root crop to prepare the land for future corn crops. The frequent stirring which takes place during summer and autumn —when the nitrification of the soil is most active—not only furnishes the roots with nitrogen, but also brings into growth and at the same time destroys the weeds.

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DR. H. ZERENER is the discoverer of a substance called the Antimerulion, which can be used either in a liquid or dry state for the protection of wood and other materials from rot, mouldiness, fungus, white-ants, &c. The invention has been patented in Germany and Austro-Hungary, and the inventor received a diploma of honour at Magdeburg in 1880, and a prize medal at Braunschweig in 1881. Judging from the testimonials published, the Antimerulion seems to be much appreciated on the Continent and also in Bombay where there is an agency for its sale. If it would prevent the destructive ravages of white-ants, it would be hailed as a blessing by every house-owner and householder in the East.

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A HOME contemporary writing on the subject of Indian and American Silver, says that President Cleveland's inaugural address at Washington has been received with general satisfaction. Unfortunately, however, it contained one intimation which may possess grave consequences for the Indian Empire. Though the President only hinted in a guarded way at a possible suspension of the Silver Coinage Act, he is well known to entertain very strong opinions as to its necessity. And this, in the interests of the United States, is perfectly demonstrable. Under the existing Silver Coinage Act the American Government is bound to coin nearly five million sterling pounds of silver a year. Thirty-seven millions in silver dollars has now actually been struck. Of this only nine millions is in circulation; the rest is locked up in the Treasury vaults. In order to avoid the natural consequences of this condition of affairs the policy of issuing silver certificates was introduced, and twenty millions in certificate paper circulates on a nominal equality with gold. The equality is strictly nominal; in the last few years both silver dollars and certificate paper have steadily been depreciating. Unless American finance is to fall into chaos, this process of depreciation must be arrested, and the only way to effect this is by suspending the Silver Coinage Act. When this is done, obviously five millions a year of silver must find a market elsewhere. Unless the Indian Government declines to keep its Mint open as now, the liberated silver will naturally stream into India. As India already pays twenty millions a year interest and military charges due entirely in gold, with an increasing addition to this liability owing to the normal fall in silver, and as flagrant injustice is inflicted on Anglo-Indian remitters to this country, such a prospect is alarming. It may, however, oblige administrators to address themselves to a difficulty which they have shirked on account of its gradual development. Unluckily financiers are by no means agreed, and while they wrangle, the disaster may occur. It is not impossible, however, that the bimetallism of the Stracheys may now secure serious attention, and perhaps in the reform of her currency India may owe yet another benefit to the financial genius of the two brothers.

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THE Government of New Zealand are doing their best to encourage the establishment of a beet sugar industry even by the offer of a bonus. Up to the end of June 1884, an offer remained open of £1,000 for the first 125 tons of sugar manufactured from beet. Nothing came of it, and it is now announced that the Colonial Treasurer will pay out of the Consolidated Fund a bonus of one half-penny per pound to the person producing the first 1,000 tons of sugar from beet or sorghum. A little calculation will show that this is slightly more than half the value of the previous offer. For the first fifteen years, however, from January, 1885, no duty by way of excise is to be paid, while the present import duty of one halfpenny per pound continues; and if the import duty is increased, the excise duty is always to be one halfpenny less. On the other hand, if the import duty is reduced or removed, a bonus equivalent is to be paid. These terms, it must be admitted, while not equal to the former, are still very favourable; and it remains to be seen whether some enterprising capitalists, either here or in the Colony, will be prepared, in the present unsatisfactory condition of the sugar market, to take advantage of them. The same writer goes on to point out that in continental beet-growing countries, the industry is only rendered profitable by the bounty. In Germany eighteen-pence per day of eleven hours, together with potatoes, light, and lodging, is all that is given to the men working in the sugar factories. This is even a long way below West Indian rates. But even with this advantage the profit of £5 12*s*. 6*d*. per morgen—six-tenths of an English acre on the beet, divided over the whole area of cultivation, gives only an average all over of 37*s* 6*d* per morgen, or a sum about equal to the rent paid. At the present time the price of sugar is £4 6*s*. 4*d*. per ton under the cost of production, and when it is remembered that beet sugar must be sold as made, that it suffers heavily from an increase of glucose if stored, it will readily be acknowledged that the cultivation of beet in New Zealand is likely to be attended with considerable risk so long as the continental bounty system exists.

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A CORRESPONDENT writing to a contemporary on the value of corn fodder says :—"Farmers in general do not realize the value of corn fodder as a winter food for cattle. The manner of feeding it has a great deal to do with its value, for when cattle are turned into the corn field after the corn is husked, they will eat but a little and trample down nearly all of it, and this is the true nature of cattle, for even in good pasture they will eat a little in one spot, and walk on, eating as they go. This will of course play havoc in a corn field, and over half of the fodder will be trampled under foot, while if the fodder is worked up with a cutter and fed in the stable they will eat all of it and seem to relish it, and the extra trouble and expense of cutting it is amply paid for by both the cheapness of the food, and how nicely the animals thrive on it. Prior to the winter of 1882 I had been feeding nothing but hay, but that winter the price of hay was so high I thought I would look for some cheaper feed and concluded to try corn fodder. The loft, which is a very large one, was filled with the long fodder. It was then put down through holes in the loft floor and fed to the cows in their feeding troughs. The holes in the loft floor were designed to put hay through, and were not large enough to put the long stalks through easily, and consequently made very awkward handling. The cows of course would not eat the largest stalks, but would pick off the leaves and tops, and what was left had to be carried out daily, and before spring we had an immense pile of stalks outside the barn. For all this was an awkward way of feeding, the cost was so much less than with hay, we intended feeding it again the following winter, but hit upon a much more convenient method of handling it. The fodder was cut up fine and fed to the cattle in baskets. It made a very clean food, easier to handle than hay, and we were very well pleased with it. Our cattle, 80 in number, had nothing but this cut fodder, with a small allowance of grain, all winter. They ate it up clean and thrived well upon it, coming out in the spring in excellent condition. The next summer, about the 1st of July, we planted several acres of corn in drills, about three feet apart, and rather thick in the drills, our object being to have green fodder to feed to the cattle during August and September, when pasture is always dry and scant, and as it was unusually dry that year, the fodder, of which we had a large yield, made an excellent substitute to take the place of grass."

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THE Celestial Empire has been a sealed book to the world from time immemorial. The jealousy with which [illegible] presence of a "barbarian" among the people of the Flowery Land is regarded, precludes the idea of its ever being opened up to European enterprise. Now and again, however, a traveller more daring than his brethren, ignoring his personal safety, has managed to penetrate into the distant provinces of the Empire, and enlightened the world in regard to its natural productions, and the habits and manners of the inhabitants. Mr. Hosie, of the consular staff in China, has just rendered great service in exploring a remote section of the land, and the narrative of his journey through Central Ssu-ch'uan will be read with great pleasure by all classes of readers, especially by those who are interested in the development of a new industry. The object of Mr. Hosie's mission was to make inquiries regarding the nature and economic history of the insect wax which is so extensively used to make candles, though comparatively little of it is exported to Europe. The insects which were the special object of Mr. Hosie's solicitude are produced in the galls found in one species of trees. After escaping from these excrescences, they deposit their cerous secretion on the leaves of another, to which they are carried long distances by porters, who travel at a rapid pace over mountain and valley and river, terrified lest the precious freight, by escaping from their nests, should nullify the entire purpose of what Mr. Baber has described as their headlong flights. The first coating of the wax on the boughs and twigs has been compared to a layer of quinine. This deposit gets thicker and thicker, until after from ninety to a hundred days the wax has attained a thickness of about a quarter of an inch, the period varying according to the region in which the operation goes on, and the character of the season. Then, the insects having exhausted themselves, the branches are lopped off, and as much of the incrustation as possible removed by hand. This is placed in an iron pot, with water, and the wax rising to the surface at melting point is skimmed off and placed in round moulds, whence it emerges as the white wax of commerce. A second quality is obtained by boiling the twigs, and a third by placing the residuum of dead insects in a bag, and squeezing them until they have given up the last drop of their precious fluid. Finally, as a Chinaman is the thriftest of the human race, the crushed pulp is used to feed the pigs, which fatten into that mellow-flavoured pork so dearly prized by the Sinetic epicure. This wax, which varies greatly in price according to the vicissitudes of the seasons and the consequent mishaps of the insect-farmers, is so hard that, while tallow melts at ninety-five degrees, one hundred and sixty can be reached before the cerous excretion which Mr. Hosie was sent to study shows any symptoms of giving way. Hence, in Cheungk'ing, a portion of it is mixed with ordinary tallow, to give the latter a firm consistency, and the candles of this alloy are dipped in melted white wax, which imparts to them a harder sheathing, and prevents the "dips" from "guttering," or running over when they are lighted. It is, therefore, clear that it is a product of which a great deal more ought to be made, and now that the Kew authorities have the subject in hand, with specimens of the different trees on which the insects live, it is to be hoped that they may be duly introduced here and in Australia, where they may reach greater perfection than in their native land.

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Dr. H. F. Carriel, Superintendent of the Illinois State Central Hospital for the Insane, at Jacksonville, Illinois, in his official report of the management of the institution, includes the following in regard to the feeding of ensilage to the cows kept to supply the institution with milk :—In the first year's experiment we were not as successful in preserving the ensilage as we have since been, by reason of moisture passing through the brick walls. On opening our first pit we found about six inches on top mouldy. We lined up the walls with boards, and have since put about a foot of straw on top of the ensilage before covering with plank, and our success in preserving the fodder has, since the first year, been nearly perfect ; we had ensilage enough, both last winter and the winter before, to feed our cows for about three months. Commencing about the middle of December we fed from forty to fifty pounds per day, or rather twenty or twenty-five pounds twice a day, with two quarts of bran and one quart of cornmeal ; the cows ate it well and were even greedy for it. This was fed morning and night, and a feed of hay given at noon. Both seasons the cattle have come out looking fatter and in better condition in the spring than even before. The milk and cream more nearly resemble grass milk both in looks and taste. Our cows give more milk when fed on ensilage than when fed on hay, with the same amount of grain ; as evidence of this, our cows fell off five gallons of milk per day in three days after the ensilage was exhausted, and this was not caused by any change of temperature or severe storms. These, then, are some of the conclusions we have come to, without, of course, paying enough attention to the subject to make them of much scientific value, but some of these may do to put down as facts, *viz.*—That from sixteen to eighteen tons of green corn is about the average yield of one acre ; that the feeding value of this fodder, ensilaged, is two-and-a-half to three tons to one of hay ; that cattle do better and will gain more in weight when fed on hay ; that cows will give more milk, and the cream and butter will be more like grass butter when fed on ensilage ; that calves do exceedingly well when fed on it. In short, we believe in ensilage, and have put down 100 tons again this season, but we have never used anything but corn for this purpose."

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The statistician in the Department of Agriculture, America, delivered an able address at the late Philadelphia meeting of the American Association for the Advancement of Science before the section of economic science and statistics. What he undertook to show were the following three propositions. And it would be well if our administrators would ponder over the remarks made by him in this connexion. He said :—"The folly of attempting to 'feed the nations of the earth,' and neglecting the organization of all constructive forces and the development of the highest skill in production. 2nd, That every nation must be practically self-supporting, making possibly a few exchanges from an occasional surplus for a few luxuries that are unessential. 3rd, The consumption of the United States is the main stimulus of its production at the present time, and will be in the future. It has been the fashion among publicists and legislators to talk boastfully of our ability to transport the raw products of agriculture across seas to other continents for the food supply of the nations of the world. It is thoughtless talk, uttered under the inspiration of our emblematic spread-eagle, that boastful bird of the nation, and unworthy of intelligent and thoughtful citizens It is folly, born of ignorance, to talk of subsisting large masses of the population of the world after supplying the wants of our own people.

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"It is true that our production has advanced with wonderful strides. While population doubled *in twenty-seven years*, the wheat area doubled in fifteen ; there were four *millions* of farms in 1880, and but two millions in 1860. The maize crop of one year is equal to the product of four years in Europe. The supply of wheat per capita was only 4·33 bushels in 1849, 5·5 in 1859, 7·46 in 1869, and 9·2 in 1879. We might produce 20 bushels per capita, but it would be folly to do it. The area in wheat is now 38,500,000 acres, and 12,000,000 acres are cultivated in excess of the wants of the country, the produce of which must be sold abroad, mainly in Liverpool, in competition with the grain of Russia, of South America, of Australia, and of India. It is sent 1,500 miles by land and 3,500 miles by sea, and from California more than half round the world, to compete with the half-civilized fellahs of Egypt and the slavish ryots of India. It is a competition unworthy of American freemen, and utterly unnecessary, being caused by bad calculation in the distribution of crop areas, for while we export one-third of the wheat production, we import one-seventh of all the barley consumption, and $100,000,000 worth of sugar at foreign valuation, which brings $150,000,000 in our local markets in addition to the costs and profits of refining here. This inequality of production is the result of temporary conditions, which, it is hoped, the good sense and correct judgment of farmers will remedy in the early future. The pioneer settler is far less a farmer than a speculator. At present he is engaged in a land speculation, appropriating acres from an unoccupied domain to bequeath to posterity, possibly a little reduced in productiveness, but certainly largely enhanced in price. And he finds it convenient to grow wheat year after year, till the weeds choke out all growth, with little labor and no cultivation, to get the ready cash with which to construct houses and barns, build fences, buy ploughs and reapers, and more cheap land. At a later day the pioneer, or his successor, will be quite as progressive as the advanced cultivator of the older settlements.

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"I do not say that we may not produce a surplus of food sufficient to feed two or three small nations of Europe, but that it would be both impolitic and unprofitable to do it. We have both the land and the labor, but prefer to have a wiser distribution of labor in production. Doubtless our customers in Europe would find it profitable if unequal distribution of productive effort should produce a great surplus of cotton, wheat, maize, or meat. Not many years have elapsed since cotton-growers were compelled to accept $45,000,000 less for a crop of four and-a-quarter million bales than they received for the preceding crop of three million bales. Young Jonathan wishes it to be understood that he is quite too 'cute' to cultivate a continent exclusively for the benefit of outsiders; he is not yet so philanthropic as to accept meekly all the work, and give others all the profits. He is willing to relegate to his friends across the large water all the fame and fortune that comes from that sort of philanthropy.

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" The facts of industry and wealth, in the history of nations, show that accumulation, thrift, national wealth, do not depend on mere numbers, as one might suppose from a careless reading of political economy. The old idea that population enhances prices *is* at best a half truth. It is industry rather than population that creates wealth. Paupers do not enhance prices, nor idiots nor tramps cause a rise of 'rent.' The increment is proportionate, not to numbers, but to productive forces in action, degree in skill, persistence in labor. So labor that is inharmonious and unequal in its distribution among the industries is unremunerative. If nearly all workers are in agriculture, there may be abundance of food, and but few other comforts or appliances of civilization, and little money to procure any. Agricultural nations are proverbially poor. In India 70 per cent are engaged in agriculture, yet its products have been estimated at a value of $8 per capita; in this country 44 per cent are so engaged, and agricultural production averages $64 for every man, woman, and child of the population. So it is everywhere in Europe as well as in less favored quarters of the globe. Should we so unequally distribute labor as to be compelled to sell grain to buy dry goods, there is a bar to the disposal of a large surplus in the fact that few nations can afford to buy, or pay for if bought, except to a very limited extent. Fifteen years ago, when our export of grain was far less than at present, less than three per cent of our wheat surplus went to all other countries exclusive of Great Britain and her dependencies.

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" Again, while our agricultural surplus is greater than that of any other country on earth, it is insignificant compared with the volume of our consumption. We exported in 1883 products valued at three hundred and sixty-two million dollars, and the same year had to pay from this sum two hundred and forty millions for food and drink imported, besides large additional sums for transportation and commission. When we remember that these exports are reckoned in sea-board prices, and that farm prices are only half or two-thirds as much, the difference between shipments and receipts is narrowed down to a sum that is small, if not insignificant, compared with the value of the home consumption. After paying for imports of food and beverages with exports, it is found that only 2 or 3 per cent of a net surplus of material for subsistence is left, and that is an exceptionally large national showing. Other countries balance far more nicely their little exchanges of food products. Nations must be independent in the matter of subsistence or risk their very existence. We cannot depend on Europe for a market for our farm products. There must be such distribution of labor here that the farmer can get a fair price for his productions without hawking them around the world to be eaten up by an army of carriers and forwarders. Our cotton is exceptional. We produce nearly two-thirds of all grown in the world, and find it profitable to supply fibre for the spindles of Europe. We consume a third, and shall, ere long, manufacture one-half, and should ultimately use two-thirds in domestic manufacture. But in cotton, in food products, and all other exports, the exportation is but one-twelfth of the production.

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" Relative to the second proposition, that every nation must be practically self-supporting, there need be little discussion. It is a self-evident truth. Otherwise national bankruptcy would only be a question of time. But may not a nation be dependent on another for food, if an equivalent can be given in other merchandise? The facts of production and consumption show that few nations do, and very few dare, fail to produce a nearly full supply of all the essentials of food supply. I have the facts as to the principal nations of the world; there is no time here for their presentation, but they substantiate the fact that every nation makes a vigorous effort to produce its own food supplies.

There is one apparent exception. Great Britain has little land and many people, most of whom are making goods, selling and shipping them, steaming over all seas and trading over all lands, filling the small gaps that occur in the production of civilized nations, and furnishing cheap goods to the half-civilized and barbarous people. Only one-eighth of the people in occupations are engaged in farming industry, while 57 per cent are in industrial occupations. Five hundred years ago nearly all were employed in agriculture, and could only feed the people. Now 12·5 per cent only are so employed, numbering nearly or quite as many as at the former period, and yet these few are able to produce 60 per cent of the food required for all the people. If one half the area of Great Britain can thus supply six-tenths of the food required by the labor of an eighth of the workers, where can the continent of America send the raw products of its future agriculture for consumption?

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" The industrial policy of England tends to concentrate her manufactures, to scatter her farms to Africa, Australia, and America. She prefers to grow her meat in Montana and her wheat in Dakota, or in Australia or India. But, as I have said in a recent publication, this exception is more apparent than real. English capital owns lands, herds, flocks in other countries, and receives cotton, wool, meat, and grain as dividends. If the dividends of English capital in the United States should be made an offset to our heavy bills for exports of products of agriculture to Great Britain, there would be but a trifling balance of that trade in our favor. Great Britain has land enough to feed all its population, if applied to the production of food and cultivated to the height of its productive capacity. But Great Britain prefers to make cloth and build ships, to establish country seats, practise landscape gardening, and hold game preserves; to grow mutton in Australia, fence in the mountain parks of Colorado and Wyoming for beef production, and establish great granaries in Dakota. Land is too valuable for agriculture in England; its title-deed is held as a primogenital badge of respectability, not to say of nobility. Laborers are bidden to emigrate or starve, and tenant-farmers are willing to sacrifice their birth-right and their patrimony for a mess of English pottage or Scotch oatmeal to eke out continued meagre subsistence on their native soil. The world is henceforth England's farm, and her home agriculture must be sacrificed to the policy of underselling the manufactures of other nations—to the necessity for cheap food and low wages by which alone to make that policy practicable. We can produce a surplus by neglecting production in other directions, but we cannot sell, if produced beyond a limited quantity, and then only by accepting the prices that our customers choose to give.

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" This brings me to the third proposition, that our own consumption furnishes the best stimulus to production. In some some suggestions on the industrial economy of the country, entitled 'Farm and Factory,' I have said that the domestic trade of a country is always its principal commerce. In this country the foreign trade probably represents scarcely $1 in $20 of the grand volume of mercantile transactions. It might be less without the slightest inconvenience to a human being of the importer alone excepted. With an area bounded by the two great oceans of the globe, and touching the domain of everlasting ice on one side and that of tropical temperature on the other, there is little need to go beyond its boundaries for anything. This continental area includes a range of elevation occupied in agriculture of 7,000 feet, giving variety of climate and production without regard to latitude. North Carolina and New Hampshire have a range of 6,000 feet, and California still greater difference of altitude. North Carolina produces rice and wheat, figs and apples, and supply both ice and sugar for its insidious yet popular potations of peach brandy. The productions of the United States range from lichens to lemons, and include the fruits of all zones, from gooseberries to guavas. With these resources of soil and sun, of coal, iron, of gold and silver, of water for transportation and for power, of mind and muscle, of skill and genius, how stupid the folly of desuetude, how abject the shame of inanity, how injurious the crime of idleness. To go thousands of miles for that which we can produce from our surplus labor would be burning the candle at both ends, and drifting into the darkness of national poverty. Our population doubled in 27 years from 1853. It will double again, it is estimated by Professor Elliott, in 30 years, in 1910. Assuming 35 years and 40 years for subsequent duplications, the population will be 400,000,000 in 100 years from the present date, or nearly one-third of the present population of the world, with a consuming power, there is reason to believe, of nearly half the world. This is the field, rather than a foreign one, which American agriculture is called to fill in production and distribution—a field broad enough to satisfy the largest ambition. Should it require two centuries instead of one to reach this enormous figure, the field would still be large enough to nearly monopolize the results of American labor. There is ground for belief that with a growing symmetry in our industrial development, with culture of brain and deftness of hand, there will advance, by equal steps, an agriculture replete with skill, abundant in yield, varied in production, and remunerative of labor beyond the present dream of the rural class. There are signs of such progress which should attain such fruition. The rate of advancement will depend much upon the intelligence and action of the farmers of America."

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A New York butter-maker gives the following rules for butter-making :—" Decide your line of dairying—butter, or cheese, or both. Select your cows according to the line of dairying chosen. Test each cow separately, and reject all not suited to your line of dairying, or that fail in quality or quantity of milk. Feed liberally, have pure water always accessible, and keep a mixture of equal parts of salt, ashes, and sulphur within reach of the cows. Be sure your stables are thoroughly ventilated, remove all droppings immediately, and freely use absorbents and deodorisers—such as sawdust, dry earth, or cut straw, never omitting a liberal use of plaster. Be scrupulously clean in every particular, both in keeping the cows and in milking and handling milk. By all means avoid exposure of the milk to the hot sun and to foul air. Air and cool your milk as fast as possible down to at least 70 degrees, if you carry it any distance to a factory or creamery. Do the same if you make it into cheese at home, though you need not go below 80 degrees if made up immediately. When the milk is kept over-night to be carried to a factory, the temperature should be reduced as low as 60 degrees. If milk is set at home for cream, the sooner it can be set after milking and the higher the temperature the better, as cream rises best, and almost wholly, while the temperature is falling. Never reduce the temperature below 40 degrees, as a lower temperature has a tendency to chill the product and injure its keeping quality, and it expands the water, rendering its relatively greater density less instead of decreasing it. To go 5 degrees below 40 degrees would have practically the same effect as raising the temperature 5 degrees, and to that extent retard the rising of the cream. Skim as soon as the cream is all up, or so much of it as you wish to take from the milk. Keep your cream, if not churned immediately, at a temperature of 64 degrees or below, but not below 46 degrees. Churn at such a temperature between 55 and 64 degrees as experience shows you is best. Conditions vary the temperature for churning. Stop the churning when the butter is in granules about the size of wheat kernels. Draw off the butter-milk and wash in clean water before gathering the butter, until the water runs clear. If one washing is in brine it is all the better, as brine coagulates the cheesy matter, which dissolves, and is then washed out. Salt to suit customers, using none but refined salt made for dairy purposes. The best American salt is as good as any. Put up in such packages as are demanded by your market. If for long keeping, pack firkins, set in a cool, sweet place, and keep the butter covered with brine.

COCA: ITS SOURCE, CULTURE, &c.

A very interesting lecture was delivered by Dr. Bidie, M.B., C.I.E., at Madras on the 28th March last, on the value of the Coca leaf as a therapeutical agent, both in surgery and medicine. Dr. Bidie said that owing to the medicinal and other properties that it has been found to possess, it is likely to become of very great importance as a commercial product ; and he went on to say that the substance known as coca consists of the dried leaves of a South American plant, known to botanists as *Erythroxylon Coca* ; and that in Southern India there is a species which somewhat resembles the American one, *viz. E. monogynum*, which was formerly called Sethia Indica, and is common in Cuddapah and various other dry districts, where it is known as *Devadaru* and *Adavi goranta*. He said that during the famine in Cuddapah, the starving people were found to be eating considerable quantities of the leaves of a shrub, some of which were sent to him for identification. Judging from their appearance, the leaves, which were rather dry and fibrous, did not seem likely to afford any nourishment, nor had they any special taste or flavour to commend them as a relish or condiment. They were found to belong to a species of the same genus as the South American coca, and he thought that, like it, they probably possessed the property of allaying hunger and staving off fatigue. No chemical examination had, so far as he knew, been made of the leaves of the *Devadaru* eaten by the famine-stricken people, but it was a curious coincidence that they should have been so used. Further enquiry may reveal that the Madras species contains some active principle allied to, or identical with, that of the American plant.

Botanically described, the *Erythroxylon Coca* is a native of the east of Peru and Bolivia. It belongs to the tribe *Erythroxylea* of the order *Linaceæ* or flax family, and its specific appellation, coca, according to Markham, is supposed to be derived from the native name, *khoka* or *tree*, that is, the tree *par excellence*. Dr. Bidie said that it was now some time since the plant was introduced into the Madras Presidency direct from Kew, and also by Mr. Cross, when he paid his last visit to the Nilgiris, entrusted with some new species of cinchona. As seen here, and also in its native country, coca is a bushy shrub, with numerous smooth leaves of a beautiful golden green colour above, and paler and glaucous on the under-surface. The leaves are lanceolate or somewhat oval in shape, and tapering at the base towards the leaf stalk. At the upper end they are blunt and emarginate with, when young, a little prickle-like process in the middle of the notch. The characteristic marks of the leaf are two arched raised lines on the back, which extend from the base to the apex—one on each side of the midrib—and enclose a space which is somewhat hollow and paler in colour than the rest of the surface. The flowers are small, on slender drooping stalks, and of a yellowish colour. The fruit is a pretty little drupe over one-fourth inch in length, of oblong ovoid shape, quite plump when green, but furrowed longitudinally when dry. It takes from a fortnight to three weeks to germinate in Madras, and is easily raised in pans containing a mixture of leaf mould and sand.

Dr. Bidie said that Coca was cultivated to a very large extent in Peru, Bolivia and Columbia, and also in parts of Brazil, the Argentine States, and other countries of South America. It is said by Bentley and Trimen, in their " Medical Plants," to thrive best in the moist mild climate, which exists at an elevation of from 2,000 to 5,000 feet above sea-level in the warm moist valleys of the eastern slopes of the Andes of Peru. But the coca plant in the Madras Presidency thrives very well at sea-level on the coast, but its culture would probably be found much easier and more successful at higher elevations, say, from 1,500 to 6,000 feet.

He went on to say that the commercial product known as coca, consists of the dried leaves, which are used as a masticatory by the Peruvian Indians to give comfort and enjoyment, just as the betel *leaf* is chewed in India. Its history, he said, was peculiar. From time immemorial the inhabitants of countries on the Pacific side of America have used this leaf, and, according to Markham, the Peruvians still look upon it "with feelings of superstitious veneration." In the time of the Incas, the former rulers of the country, it was employed in sun-worship, and also in barter instead of money. After the Spanish conquest, some fanatical invaders proposed to proscribe its use and stop its culture, on the grounds that it fostered ancient superstitions and took away the Indians from other work. In 1569 the second Council of Lima condemned its use, because it was "a useless and pernicious leaf, and on account of the belief, stated to be entertained by the Indians, that the habit of chewing coca gave them strength, which is an illusion of the devil." About the same time the Spanish Government interfered with the cultivation, on account of the unhealthiness of that valley, in which the "cocales" or plantations were situated. Subsequently, between 1570 and 1574, the Viceroy, Don Francisco Toledo, endeavoured, by various edicts, to regulate the industry, so as to protect the health of the Indian labourers, and to ensure their being properly paid. According to Bentley and Trimen, the total annual produce of coca in South America at the present day is probably not less than 40,000,000 lbs., which, estimating the value on an average at the low price of 1*s.* per lb., gives a total of £2,000,000 sterling. The great virtues ascribed to coca have from time to time attracted the attention of travellers, physicians, and chemists, but until quite lately its merits have, in Europe, been considered somewhat hypothetical. Now that the value of its alkaloid, as a medicinal agent, has been fully established, we may expect that further uses for it will be found, and that a demand for it will arise throughout the civilised world.

Dr. Bidie gave the following as the mode of culture in South America:—The coca plant in Peru is raised from seeds sown in a small nursery, generally protected from the direct rays of the sun by a thatched roof or rows of maize. Sowing commences in December and January, when the rains begin. After sowing, the seeds require to be regularly watered, and may be expected to come up in from two to three weeks. In the following year, when from 1½ to 2 feet high, they are transplanted to prepared ground in the plantation, generally in terraces, where they are placed in square holes about a foot deep, and with the sides supported by stones to keep the soil from falling in. Three or four are planted in each hole, and allowed to grow up together. In level ground they are planted in furrows separated by walls of earth, at the foot of each of which a row of plants is placed. The usual distance apart is eighteen inches each way; and the culture extends up the steep sides of the valleys, as high as 8,000 feet where the mean temperature is 64 to 68 Fahr. "At the end of eighteen months the plants yield their first harvest, and continue to yield for upwards of forty years." The plants require to be very carefully weeded, and if the rains are favorable, three crops of leaves may be expected every year. The produce of an acre is estimated by Weddell at about 900lbs. in a favorable season, but the average is doubtless less. The leaves should not be gathered till mature, at which time they are bright-green on the upper, yellowish green on the under, surface, break off easily when bent, and have an agreeable, and somewhat fragrant, smell. They must be collected separately and carefully so as not to injure the buds that produce the following crop, and to prevent their being torn or bruised, which would impair their commercial value. The harvest is greatest in a hot, moist situation, but the best flavoured leaves are said to come from plants growing in drier parts high upon the sides of the hills.

The green leaves, when picked, are carried in cloths or baskets to the drying yard, where they are spread out on woollen cloths or on floors formed of slate-flags, and dried in the sun. Very great care requires to be exercised in the drying process, as, if dried too rapidly, they get shrivelled and brittle and lose their odour and green colour. On the other hand, if imperfectly dried, they get dark in colour and have a disagreeable odour and taste when packed. In small experiments in Madras, Dr. Bidie found it better to dry them on a table in an airy room, and not in the sun. In some districts it is said the leaves, while yet green, are trodden down with the feet, so as to give them a delicate flavour. This may have the effect of producing a mild sort of fermentation in leaves which have been bruised. Well cured leaves are uncurled, of fine green colour on the upper surface, and grayish beneath. They have a tea-like odour and pleasant taste, and produce a sense of warmth when chewed.

Badly-cured leaves are dark-coloured, less fragrant, and devoid of the warm feeling when chewed. When dried, the leaves are either stored in houses or packed in sacks of cloth (*costos*) lined with banana leaves, each of which weighs about 20 lbs. The size of the packages varies in different districts from 20 to 150 lbs. There can be no doubt that the Coca suffers in transit or when long stored in bags, and that it would be a great improvement to pack it in like tin, or lead-lined chests, of tea. Shuttleworth in the *Pharmaceutical Journal*, Vol. VIII, p. 222, says that "in South America particular care is taken to procure the leaves in as fresh a state as possible, and many writers have ascribed the want of effect to the use of old leaves. I have no doubt but coca deteriorates by age, as will also tea and most medicinal plants; but I am certain that it does not become wholly inert if preserved with care." Dr. Squibb observes that "coca is well known to be a very sensitive and perishable drug;" and again, "very much like tea in this and other respects, it should be packed and transported with the same care and pains in leaded chests or in some equivalent package. It is very well known that tea, if managed, transported, handled and sold as coca, it would be nearly or quite worthless, and therefore coca, managed as the great mass of it is, must be nearly all of it comparatively worthless."

If coca grown in India is ever therefore to take an important place in the European market, it must be dried with great care, and packed so as to preserve its virtues. In South America not less than 8,000,000 of the inhabitants habitually chew the leaf, and deem it as much necessary as the people of this country consider the betel-nut. As, until within the last few months the consumption of coca for medicinal and other purposes has been small, it is probable that it will be some time before the supply grown in America overtakes the demand for it which has sprung up in Europe and elsewhere, owing to the wonderful anæsthetic action that the alkaloid made from it exercises, when applied to mucous membrane and other tissues of the body. This alkaloid, cocaine, was recently sold in London at prices ranging from 2*s.* 6*d.* to 4*s.* the grain, and when it is mentioned that the leaves do not on an average yield more than 0·2 per cent, it will be obvious that there is abundant room in the English market for additional importation of the leaf, and good prospects of liberal profits for the grower. It has also to be repeated that the leaf is very perishable. After being stored for five months in its native country, it is said to lose its flavour, and to become worthless Supplies of the fresh article will always therefore be in demand.

With regard to the modes of using the coca leaf in South America, Dr. Bidie said that the Peruvian Indians masticate the coca in combination with the alkaline ashes of the stalk of the quinoa plant (Chenopodium quinoatrus.) In other places, pulverised quicklime is used. In Brazil the leaves are first dried, and then reduced to powder in a wooden mortar along with the ashes of a plant. An Indian usually partakes of coca three times a day, and consumes altogether about three ounces of the leaves daily. As it is chewed, it emits a grateful fragrance and promotes the flow of saliva; and according to Markham, "its properties are to enable a greater amount of fatigue to be borne with less nourishment, and to prevent the occurrence of difficulty of respiration in ascending steep mountain sides." It is also sometimes infused like tea, and the beverage drunk; and Mr. Holmes, of the Pharmaceutical Society's Museum, he said, informed him that a nice liqueur is prepared from the fresh leaves in Bolivia. A fluid extract, prepared in South America from the fresh leaves, has for some time been imported into England.

As to its properties and uses, Dr. Bidie said that coca has long been regarded as a stimulant of the nervous system and a sustaining agent, and the poet Cowley, who lived in the middle of the 17th century, put the following words into the mouth of an Indian Chief when addressing the heathen goddess Venus :—

> " Our *Variocha* first his *coca* sent
> Endow'd with leaves of wondrous nourishment,
> Whose juice succ'd in, and to the stomach ta'en
> Long hunger and long labor can sustain ;
> From which our faint and weary bodies find
> More succour, more they clear the drooping mind
> Than can your *Bacchus* and your *Ceres* joined.
> The *Quittoita* with this provision stor'd
> Can pass the vast and cloudy *Andes* o'er."

Dr. Mantegazzo of Florence, who visited Madras a few years ago, on a scientific expedition, always carried a supply of Coca wherever he went. He became acquainted with it while resident in South America, and carefully investigated its properties. According to him, when taken in excessive doses it causes delirium, hallucinations, and ultimately congestion of the brain. In full doses it stimulates the heart and respiration, and increases the temperature of the body. When chewed, as the natives do, or given in weak infusion, it promotes digestion. In larger doses it stimulates the nervous system, so that muscular exertion is easily undertaken. Mantegazzo recommends its use in a variety of diseases.

In 1876 Sir R. Christison, the veteran therapeutist, made some experiments with Coca on himself and the students attending his class. From these he arrived at the conclusion that "the chewing of Coca removes extreme fatigue and prevents it. Hunger and thirst are suspended ; but eventually appetite and digestion are unaffected. No injury whatever is sustained at the time or subsequently in occasional trials ; but I can say nothing of what may or may not happen if it be used habitually. From 60 to 90 grains are sufficient for one trial ; but some persons either require more, or are constitutionally proof against its restorative action. It has no effect on the mental faculties so far as my own observations go, except liberating them from the dulness and drowsiness which follow great bodily fatigue. I do not yet know its effect on mental fatigue purely. As to the several functions, it reduces the effect of severe protracted exercise in accelerating the pulse. It increases the saliva, which, however, may be no more than the effect of mastication. It does not diminish the perspiration so far as I can judge."

About the same time that these were obtained by the scientific observer in Edinburgh, a Mr. Dowdeswell, who had been experimenting with Coca in London, declared that the results of his investigations were negative. He said : "Without asserting that it is positively inert, it is concluded from these experiments that its action is so slight as to preclude the idea of its having any value, either therapeutically or popularly." This testimony, being so utterly opposed to the experience of other competent observers, and to the fact that Coca has been chewed from time immemorial, and is still used by millions of people in its native country, can only be explained by the supposition that Mr. Dowdeswell did not get the genuine article, or it may have been old and inert.

Dr. Bidie said that quite recently a well-known London firm sent him a sample of what they called Coca, in order that he might become familiar with the commercial aspect of the drug as now sold at home ; but, on examination, he found that it did not contain one leaf of *Erythroxylon Coca !* But that Coca, as already stated by him, was a very perishable article, a fact which is sufficient to explain much of the contradictory evidence in existence regarding its refreshing and sustaining effect. A few years ago a number of men connected with the Toronto Lacrosse Club in Canada, resolved to try the sustaining effect of Coça in this game which involves violent bodily exertion. At the beginning of every match a dose, ranging from 1 to 1½ drs. of the leaves, was served out to each man, which was chewed gradually during the game The trial extended over nearly a year and-a-half, and the majority of the experimenters were "strongly in favour of Coca—some most enthusiastically so—while two or three out of the number remained indifferent, having derived no direct or apparent advantage from its use."

This is only what might be expected, as tea, coffee and tobacco produce, owing to idiosyncrasy or difference of insensitiveness, very different effects both in quality and degree in different individuals. Quite recently Dr. Candwell, of Westminster Hospital, London, tried on himself the effects of large doses of Coca. He first used the valoid, a fluid extract equivalent to its weight of the leaves), and increased the doses gradually from 2drs. to 2 ozs. The latter dose produced giddiness and unsteadiness of gait for about ten minutes, and then a general sensation of comfort with considerable mental excitement, and ability to read steadily for many hours, and to keep awake all night. He next tried the alkaloid Cocaine, increasing the amount from half a grain to 5 grains. The latter dose caused toxic symptoms, and produced dilatation of the pupils, which lasted for six hours. So far as is known at present, Coca exerts a double action, being a cerebral sedative in small doses, and a cerebral stimulant in large. But it is unnecessary to pursue this aspect of the subject further. *The fact that 40,000,000 lbs. of Coca are consumed annually* by the inhabitants of South America, is itself suggestive and conclusive ; and when to this are added the results of independent investigations and our recent knowledge of the action of the alkaloid Cocaine, we can have no hesitation in accepting Coca as an article quite as useful to humanity as either tea or coffee, and destined, as far as present appearances go, to become infinitely more so.

Dr. Bidie went on to say that the existence of an alkaloid in the leaves of the Coca plant was suggested as early as 1853, by Wackenroder and Johnston, and in 1855 Dr. E. Gaedeke, a German, succeeded in isolating it, but not being able to satisfy himself as to its identity with *Theine*, the alkaloid of tea, he provisionally named it "*Erythroxyline.*" But it was not till 1860 that the physical characters of the alkaloid were fully ascertained, and the honour of their description belong to Nieman who called the substance "Cocaine." Somewhat later, Lossen found in the leaves another base, which he termed "Hygrin," and which is volatile and apparently inert. The other chief constituents of Coca are *Ergonin*, *Cocatancin* and a peculiar *wax*. Cocaine crystallises in small colourless and inodorous prisms, which are slightly soluble in water, more so in alcohol, and very soluble in ether. It has a strong alkaline re-action, a slightly bitter taste, and produces upon the tongue a a temporary but almost complete insensibility at the point of contact.

An attempt has been made to change the designation of the alkaloid to *Cucaine*, but as that would be at variance with the botanical specific name, the alteration seems undesirable. The chemical formula for Cocaine is C·1·7, H·2·1, No. 4, so that it is very nearly allied in its composition to Atropine and Dyturine. The most useful salts of Cocaine are the hydrochlorate, the citrate, and salicylate. At present the hydrochlorate is the favourite preparation. It is defined as a white crystalline powder of weakly acid re-action, with a somewhat bitter taste, and producing on the tongue a temporary characteristic insensibility. When heated upon platinum foil, it should leave no residue, and it ought to dissolve in double its weight of cold water, and not become coloured in contact with mineral acids. It also dissolves easily in alcohol.

Although the local anæsthetic properties of Cocaine were recognised so long ago as 1860, curious to say no practical use was, until quite recently, made of the discovery. This was all the more remarkable, inasmuch as Dr. Hughes Bennett, in 1874, found, on investigating the action of Cocaine on frogs and other animals, that it "exerted its influence on the sensory nerves, and that the nerve-endings in the skin and the mucous membranes were rendered inexcitable, apart from any action or influence on the nervous centres." The credit of the practical application of the anæsthetic properties of Cocaine belongs to Dr. Kollar, a young physician of Vienna. He suggested, in the course of last year, its application to the eye for producing temporary insensibility during operations on that most sensitive organ, and the momentous value of the discovery was at once recognized all over Europe and America.

That since then Cocaine has received an amount of attention which shows the high rank it is likely to attain as a therapeutical agent. Professor Knapp, who was one of the first to carry out experiments as to the effects of Cocaine on the eye, found that when a 4 per cent solution is applied, the pupil begins to dilate in from ten to twenty minutes, attains its maximum in from thirty to forty-five minutes, remains stationary for about half-an-hour, and then slowly diminishes. The reduction of sensibility begins in about three minutes after the application of the solution, increases from ten to twenty minutes, and is over in about half-an-hour. When applied in appropriate quantity to the eye, it completely obliterates sensation for the time being, and renders it absolutely insensible to pain, and it neither causes irritation, induces injurious re-action, nor interferes with the vitality of the tissues.

But it is not only in diseases of the eye that Cocaine is useful, as it acts equally on the mucous membrane of the mouth, pharynx, larynx, nose, trachea, &c. It also acts quickly through wounds or abraded surfaces, but is slowly absorbed by the skin. When injected hypodermically, it acts efficiently as a nervine in doses of half a grain. The dose internally of Cocaine is from one-half to 2 grains, and, unless in large doses, it does not manifest any toxic action. Dr. Bidie explained that in a popular lecture like the present it was not necessary, nor would it be appropriate, for him to say more as to the medicinal properties of this new remedy. Although its therapeutical value was discovered only a few months ago, its fame has already extended to the utmost bounds of civilisation, and the only barriers to its extended use are its scarcity and costliness.

He said it was a very curious fact, that about three-fourths of the human race consume, as beverages or otherwise, five different articles, all of which have exactly the same active principle, *viz.*, an alkaloid called *Theine*, which received its name from having been first discovered in tea. The substances referred to are tea, coffee, mate or Paraguay tea, guarana and Kola nut, and so far as we know, these are the only plants of the whole vegetable kingdom that contain *Theine*. But we now hope that we have discovered a rival to the *Theine* group in Coca, as it possesses powers that will render it still more useful as a beverage. For those who have much mental work to get through, Coca will prove a stimulating, soothing and refreshing beverage; and to those having to undergo much physical exertion, it will be found of great value from its sustaining, recuperative, and refreshing qualities.

He said he believed we had found in it the popular beverage of the future, that which our teetotal friends have been so long searching for, *viz.*, an article that will, in physiological utility and popular estimation, take the place of alcoholic drinks. Tea and other substances, of which the active principle is *Theine*, increase the waste of the body, especially when the amount of food is insufficient, whereas Cocaine has a conservative and sustaining influence under similar circumstances. Again, tea is sometimes taken to prevent sleep, and Coca, in full doses, has the same effect, while in moderate doses it induces sleep, and will be found specially useful in insomnia as the result of overwork. We have thus, he said, a very useful agent in this substance, and what is now chiefly wanted is the discovery of some method of preparing it that will make its use as easy as that of tea or coffee, and the resulting preparation as grateful and acceptable to the million.

Mr. Holmes, Curator of the Pharmaceutical Society's Museum, wrote to Dr. Bidie: "It is a useful digestive and tonic, and if the leaf could be dried in the *form of tea*, so as to be used like coffee, as an after-dinner beverage, and flavoured like the finest Chinese tea either by a carefully watched fermentation before drying, or by flavouring with Jasminum sambac, rose flowers, Olea fragrans, Aglaia odorata, or any other delicate perfume that would mask the flavour of Coca, it might be introduced over here."

He concluded his lecture by observing that it now only remained for the planter and chemist to devise some mode of preparation, that would render the substance acceptable as a dietetic beverage in Europe. A fluid extract which is now in use to a small extent, apparently retains all the active properties of Coca; but it is treated more as a drug than as a seductive and comforting luxury, and what we want is an article that will appeal to the palate of the many, just as tea and coffee do. As further uses are found for Cocaine, its consumption will increase, and if we also had a tea-like Coca, the demand for the leaves would be very large. The subject, he felt sure, only needs to be brought to the notice of our enterprising planters to secure their attention, and if the culture of Coca can be made profitable, the South Indian planter will very soon take it up.

ON TEA.

A LATE number of the *Home and Colonial Mail* contains an interesting article, full of useful hints from a practical point of view to the tea-planter, contributed by one of their *confrères* who writes under the *nom de plume* of "Artemus." That he is an authority on the subject whose opinions will be entitled to consideration, would appear from the facts that he has had many years' experience as a planter, and he has been watching the market in London for two consecutive years. The following opening paragraph will disarm captious criticism. He says:—

"The very nature of my communication will, alas! compel me to tread upon the corns of prejudice in some quarters. This is, however, no ill-omened message for those who can appreciate large facts. On the contrary, if the industry is launched into fresh and vigorous life at the sacrifice of those who will not avail themselves of the new order of things, that price will be cheap, indeed. Let it be remembered, however, that the opinions I merely chronicle here are the growth of the time, and that to abuse the chronicler is about as pertinent as to attempt to stop the progress and results of these opinions by the mere repetition of *dustoor nahin.*"

The first point to which he directs the attention of his readers is the "poor prices" from which the planters have had to suffer for many years past, and there are practically unlimited number of reasons for this undesirable state of things, each of which may be said to be owing to no fault on the planter's part, beyond the other causes for which the planter might be blamed. The writer is of opinion he has been hitherto guided for the most part by the accumulated experience of his former superiors, and the knowledge he has gained in the course of his management, and therefore he may be reasonably pardoned for any shortcoming in turning out the indifferent tea of which so much is heard now-a-days. His knowledge not having been equal to the requirements of the case, it is not to be wondered at that he should fail in some measure. The question now is what should he do in the future to avoid the shoals and quicksands upon which so many have been wrecked. In the first place the planter has trusted too much to chance, and therefore his success has hinged too much in the happy discovery, by mere accident of some particularly "good" method as judged merely by the bulk of the outturn, without taking into consideration the quality of the article manufactured. Next when under the pressure of turning out unwieldier quantities from single estates the planter threw aside the Chinese methods of manufactures, and with that the experience of centuries and launched out upon a new career, with what result is patent to the world. In regard to machinery we cannot do better than quote the words of "Artemus." He says:—

We adopted machinery and mechanical dryers, and changed the whole system of manufacture, and for a time have been elated at the boasted "progress." We experienced the great advantages of machinery, but we had not counted the cost, as in our sublime ignorance we did not reckon with deterioration, which we had carefully opened the door to without knowing how or in what direction. That door has to be closed. Do not suppose that I am blaming any machine, far from that. Machines are essential to our factories, *but* we must reorganise our system of manufacture to bring about the good results we obtained in the old "panning" and *chulah* days; and before we reorganise our system we have yet to discover the scientific *raison d'être* for every detail necessary to our end in view—the production of perfect tea. We want no more dallying with science, no more spasmodic efforts—we want a scientific reason for the faith that will be in us when we can say: We can make good tea in all weathers. This grand aim is the only one that will satisfy the natural requirements of the case now that these are being recognised in the proper quarters. Proprietors are sick of excuses anent bad weather. Shareholders are asking why bad weather for manufacture is allowed to affect quality in these scientific days?—and there is more sense in this question than in many asked by their class. Provided the weather admits of properly matured leaf being gathered, that is as far as dependence upon the weather should be allowed to affect the question. After that, quality and weather should be divorced. With the introduction of ensilage and harvest-saving machinery, this has been brought about in other crops; tea "manufacture" must be overhauled in its turn, and rule-of-thumb replaced by due attention to rules formulated in strict accord with the series of chemical actions, mechanical actions, &c., involved in the production of good tea.

Taking these facts into consideration, the writer very properly asks the question, what do planters know of the reasons of their various processes, and what do they know about the chemical cause of the effect they produce? In his opinion they know nothing; as instances he cites their view about fermentation which would amuse scientific men, and the practice hitherto observed of sending the juice flying in the rolling process under the impression they were increasing the strength of their teas! The produce of "perfect tea" depends not upon one but upon all the processes involved in the manufacture, each of which is a link in a complete chain of processes which science directs to one end, and which produces as a result that state of leaf in which all the elements of good tea are to be found. But perhaps as this would be too much to aim at all at once, the planter should confine himself to the production of good tea. Here the writer refers to the manipulation in the tea-house, which he defines "as dependent upon a scientifically arranged series of processes, whereby that state of tea in which shall be found all the elements of good tea, to the full power obtainable from the green leaf as brought to the tea house, is produced." The state of the weather being at present an important factor he goes minutely into the subject, and the following remarks will be found of great practical interest:—"By sending out chemists specially selected for the purpose to each important district, with all necessary appliances for fitting up special laboratories in well selected factories, we should institute a series of tests and analyses carried on daily during the manufacture at each stage for at least two seasons. These gentlemen should keep proper meteorological records from observations taken at least four times in the 24 hours, and full comparative notes as to the effects of the rain-fall, temperature, &c., &c., upon the leaf brought in, and upon the leaf under process of manufacture at each stage. To do this the comparison must be completed with daily analyses of tea made and notes upon the hydrometer readings in the tea house, and all other points bearing on the conditions ruling. Theoretically, doubtless, chemists could formulate instructions upon the salient points to be kept in view in preparing tea, but where the weather plays such an important part as at present, I doubt whether experimental scientific investigation, such as I have briefly hinted at above, is not absolutely necessary. Again, the thorough comprehension of the present mode of manufacture is necessary to the chemist before he can properly realise the present conditions and base his advice upon these—which is a very important point to be borne in mind, as his advice should aim at utilising as much as possible present appliances. Further, without local experience, how is he to discover where wastage occurs, at present, of such vital items as the volatile flavouring properties, or of the strength-giving tannic acid, and yet to the loss of this latter will in all probability be attributed the deterioration which of late years has been so noticeable. The chemists, eventually having satisfied themselves that they had mastered the scientific detail of tea manufacture, should go into committee, and produce a *Guide to Manufacture*, explaining therein the cause for each process, and the effect to be produced, with such suggestions as to overcoming atmospheric disadvantages as may be proper. Once people know what has to be provided for or provided against, the necessary means will not be long wanting. The tea-house men of the future would thus have the chance of of learning their business and of advancing in their profession, being in possession of a reliable pointer indicating that road to improvement which is so exasperatingly closed to them at present. Of course as the climatic conditions ruling in one province are not identical with those of another, the rules proposed for Assam could not be safely followed at Dehra Doon, and *vice versa*. It would therefore be advisable to have such experiments tried in various parts of the continent of India suited to the varying climates of the provinces.

Miscellaneous Items.

The probable outturn of the tea crop in Ceylon is estimated at 3,500,000 lbs. Many old coffee estates are now entirely under tea.

Owing to the water in the tanks at Bangalore having fallen very low, large quantities of fresh water fish are now obtainable in the bazaars at nominal prices.

The Government of India concurs in the opinion expressed by the Government of Madras, that satisfactory progress has been made by the Madras Agricultural Department.

We understand that Mr. A Dowling, of Chittagong, is publishing a small work, entitled "Tea Notes," which should contain much profitable reading for planters and others interested in the tea industry.

We learn that the Kurrachee Municipality have called upon the fishermen to discontinue salting and curing fish in the present locality. They are required to carry on their business at a considerable distance from the existing site. The fishermen object to this. We shall probably soon hear of a prosecution, when the legality of the requisition will be tested.

Quetta is said to be looking its prettiest just now. The apricot and almond orchards in the valley are in full bloom, and the effect of the pinky-white cloudlike masses of blossom is very striking and pretty. Owing to the unusual amount of rain—nearly ten inches, two-thirds more than the average annual rainfall already this year—the zemindars are looking forward to bumper crops.

All the tanks at Aden are full to overflowing, thanks to exceptionally heavy rains; so the troops will enjoy during this hot weather an exceptionally liberal supply of water. The rains have caused some damage, as well as conferred a great benefit. At Shaikh Othman, the place lately acquired by the British, five miles inland, a number of houses have collapsed; and some salt-pans, recently opened by an Italian speculator at considerable expense, have been destroyed.

The Rawul Pindee Annual Horse Fair was brought to a termination on Thursday evening, the 26th ultimo. The prizes were distributed by his Honor the Lieutenant-Governor of the Punjab. A large number of the Civil and Military officials were present, as were also the Maharaja of Puttiala, and the Nawab of Bahawulpore. The Bands of the Royal Irish Fusiliers and 21st Punjab Native Infantry were in attendance. Owing to the blustery and showery state of the weather, the usual tent-pegging, &c., did not take place. The show of horses, although perhaps not so numerous as anticipated, has been good as regards quality, and numerous remounts have been purchased.

We like the suggestion that a special inquiry be ordered into the working of the Forest Act generally, and in the Thana district in particular. Surely Government have no objection to this course? An independent inquiry will show with what cruel injustice certain provisions of the Act have been applied, how popular interests have been trampled, and the feelings of a people very little removed from childhood in their rough simplicity outraged by the underlings of the Department. We have never heard a more touching protest than the poor Thanaites are in the habit of making—"Why don't you kill us and skin and bone us? Everything else you have done"! They go about in groups, praying for mercy. We are thankful the Bombay Association has taken up their cause.

Colonel Money, an authority on tea cultivation, in a letter to a Ceylon paper, remarks:—"Looking at it from an Indian point of view, it is sad for India that Ceylon has proved such a good tea-field. But though, doubtless, your yield is very large per acre, and the quality of the tea very good, there is one point not proved yet, which Ceylon planters should not shut their eyes to. In India they give the plant rest, a holiday for three or four months, less in the plains, more in the hills, and it may be, nay, it is probable, this rest is a necessity. In Ceylon you pick more or less all the year round. Is this wise? Will the tea-plant stand it? I do not say it will *not*. Manure may do much to mitigate this evil. But the chance of a collapse should not be overlooked, and were I a tea-planter in Ceylon to-day, I would, in spite of the climate, which enabled me to pick all the year round, not do so. Take it all in all, during this *last year, 1884, I must admit that Ceylon has* in a measure beaten India in quality."

The Bhundarees—dealers in toddy and toddy-spirit—of Bombay have forwarded a petition to the Viceroy, in which they state that in September last, they presented a petition to Lord Ripon, the then Viceroy, setting forth the grievances under which they had been labouring. In reply they received a telegram from the Finance Office, Calcutta, stating that their memorial was still under consideration, while about a month later, they were informed in a letter from the Revenue Department of the Bombay Government, that the Government of India had intimated that they declined to interfere with the orders passed by the local Government on the subject of the taxation and sale of toddy-spirit in the town and island of Bombay. The memorialists draw attention to what they think is an inconsistency, and beseech his Excellency to reconsider their case, because ten thousand families of toddy-drawers, who were hardly able to live from hand to mouth prior to the coming in force of the stringent arrangements, have been starving in consequence of their having been deprived of their means of subsistence.

Selections.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary General Meeting was held on Wednesday, the 25th March 1885.

Communications.

From Messrs. Macneil & Co., enquiring if any preparation suitable for removing moss and lichens from the stems of tea bushes can be recommended, as one of the gardens in their agency is much affected, and a remedy would be useful. Messrs. Macneil & Co. were informed that a saturated solution of soft soap and common salt, applied with a painter's brush, is used for removing moss from fruit trees, and is also said to destroy eggs of insects; lime, either dusted on while the trees are wet or applied in the form of whitewash, is also used. It would be interesting to note the effects of these remedies on red spider.

From Mr. J. B. Fuller, Director of Agriculture, Central Provinces, renewing his application for a Japanese Rice-husker, which has been duly sent to him.

Application from Mr J. C. Reade, Jubbulpore, for Rhea cuttings and information regarding cultivation. Supplied.

From Koour Jai Narain Singh, Didwary, forwarding a packet of the seed of *Alapoor Joour*, which is, he mentions, grown largely towards Bikaneer, in the place of sugarcane. The seed has been sown at the Society's Garden, and a report will be made when the results can be ascertained.

From Dr. T. R. Macdonald, forwarding samples for report of Jute and Cotton grown by him in the Mymensingh Jail grounds. The following report was kindly furnished by the President :—

" I have been asked for my opinion of the foregoing samples, which I have pleasure in stating thus—

Jute.—This is very long, clean, bold fibre, free from root, or nearly so, but a little dull in color; if it had been better as regards the latter, it would have been of more value, which to-day I consider to be Rs. 3 8 to Rs. 3-10 per bazaar maund This is a specimen of good growth, which I class as Kureemgunge, a quality well known in all our markets.

" *Cotton*.—Fair color, good staple, but over ginned; worth Rs. 16 to Rs. 17 a bazaar maund It has evidently been too much bowed, rendering it more wasty than it would otherwise have been.

" W. H. Cogswell."

English Potato Seed.

Only the following reports have as yet come to hand on the potato seed imported last year. and presented to the Society by Mr. W. Stalkartt :—

From Mr. F. W. Blechynden, Hurdea Factory, Chumparun, who writes that of the 14 lbs. each of the three kinds of potatos sent to him for trial, he planted two lbs. of each kind himself and sent the rest to Mr. Girdlestone, the Resident at Katmandhu. The following are the results he himself obtained :—

lbs.		lbs
2	Paterson's Victoria gave	11
2	Late Rose ,, ...	13 8
2	Veitch's Ashleaf Kidney	8·8
6		33 0

Mr. Blechynden sent some samples of each variety, and the potatos are of good size and shape, and have preserved their types.

Mr. J. Anderson, C. S., reports on the potatos planted in his garden at Bancoorah, that they were sown on 15th November 1884 in ridges and watered by hand, the soil was poor and heavy with clayey sub-soil. They were taken up on 27th February 1885 with the following results :—(1) Veitch's Ashleaf Kidney yield about six fold; (2) Red skinned (late Rose ?) about five fold fine large potato; (3) White Round (Paterson's Victoria ?) No crop to speak of; failure. Mr. Anderson says that he has tried samples; the White Round potato is mealy and of good flavour, but the others are watery.

White Belgian Carrot.

Surgeon-Major Bonavia, Etawah, sent a dozen specimens of White Belgian Carrot, which arrived in good order, just in time for placing before the meeting. He writes as follows :—

" I send you a sample dozen of *White Belgian Carrot* grown here from seed obtained from the Lucknow Horticultural Garden. I believe this carrot has a pedigree of acclimatisation in Lucknow of something like 10 years. For horses and cattle it is admirable, for feeding prisoners it is a capital thing. It cooks like *marrow* without a trace of woodiness in it. It is much like a *first class* parsnip. If this were extensively grown, it would be a fine vegetable for many purposes. Mr. Ridley in some of his reports, if I mistake not, has stated that this carrot goes into seed quickly, but here on this date (23rd March) when all the native red carrots have gone to seed long ago, this acclimated white Belgian carrot has not made a single sign of seeding throughout the field. I think it a great acquisition. Here we have a stiff 'mattear' soil, with some kunkur in it. Probably this may be the reason why it has done so well here. In Lucknow they have a loose sandy soil highly manured."

Tusser Rearing in Hazaribagh.

Mons. Claude J. Dumaine presented a paper on this subject, which was transferred to the *Journal* now in the press, and a vote of thanks accorded to Mons. Dumaine.

Mangoe Cultivation.

The following circular has been addressed by Mr. Maries of Durbhangah to gentlemen interested in the development of mangoe culture :—

" Mr. C. Maries, of Durbhangah Raj, is desirous of forming a monograph of Indian Mangoes, and as it is impossible to make it complete without assistance from all parts of India, he would be glad to receive fruit of any kind, good or indifferent, from gentlemen interested in mangoe culture, and begs to enclose instructions for information required.

Pencil drawings, water or oil paintings, tracings and fresh fruit would be greatly esteemed. Paintings or pencil drawings should be natural size.

Instructions for pencil tracings, natural size.

Slice off one side of the mangoe to the stone,—place the cut side on a sheet of paper and trace, round the edge of the mangoe with a pencil carefully.

Write on the same paper, color, weight, season of ripening, flavour, size of seed, and natural sized cross section, stringy or not, name, or names, from where procured, and any other information that may be useful, such as traditions, &c.

Instructions for sending fresh fruit.

Select three averaged sized fruit, nearly ripe, from the tree with a few well shaped leaves, pack in a small basket, in *straw* or *leaves* sufficient to prevent from shaking and despatch by rail.

Also note on paper, name, from where procured, peculiarities if any, season of ripening, and any other information, such as origin of name or any tradition that may be attached to it, and address to

C. Maries,
Durbhangah Raj,
Durbhangah, T. S Ry."

New Coleus.

Mr Bartlett exhibited a dozen plants of New Coleus out of 150 plants raised from seed, those sent by him were well-grown plants with handsome and distinct colours, many being new varieties, and all very effective and decorative.

RICHARD BLECHYNDEN, Junior,
Deputy Secretary.

PERMANENT PASTURES.

At intervals for several years past, " Laying Down Land in permanent pasture " has been treated of by Mr. Faunce de Laune in articles published in the *Journal of the Royal Agricultural Society of England*, some of which have been noticed in our columns. The whole series have since been published in pamphlet form, and the contents have elicited from Mr. James G. Wilson, Rangitikei, New Zealand, a letter to the *Rangitikei Advocate and Manawatu Argus* which we present, as under :—

" Sir,—You were kind enough to publish a short time ago a letter from me with a few remarks on grasses, in which reference was made to opinions held by Mr. F. de Laune on permanent pastures. Since then, through the kindness of a friend, I have his pamphlet on *Laying Down Land to Permanent Pastures*, and as the subject is one of great importance to a farming community like ours, perhaps you will allow me to make a few remarks on it. Mr. De Laune was a gentleman who, as he points out, first commenced farming 150 acres for pleasure, and then 900 acres more. He determined to lay it down in pasture in preference to arable farming He, too, like all of us, was dissatisfied with results, and determined to find out the cause of failure. His observations and experiences are of great value. He begins, speaking of English farmers, by saying that few of them know the different grasses, and look upon one as being as good as another, and adds :—'It is generally, I might say invariably, alleged, and truly so, that newly formed pastures have been found to deteriorate greatly after the first two or three years.' This is very much the same here. How often does one observe paddocks which have been laid down a few years, grow little else than weeds. What are the causes? First, we have on clay lands want of drainage. A retentive subsoil holds water to such an extent as to swell, and leave the adventurous rootlets which push their way down to live in winter in stagnant water, with little or no air to breathe. Is it to be wondered at that they are sickly? What would drainage do? It would allow the water to pass through the subsoil and be carried off gradually, an ameliorated condition would set in, air would also have free access, and the roots of plants would gain a fresh livelihood by feeding on the nourishment contained in it. This condition of things is scarcely the same in England, where the cost of drainage is within the means of most. Here it is out of the question for some time to come. Mr. De Laune says :—'The use of short-lived grasses and biennial clovers, coupled with an insufficiency of proper seed, is the main cause of deterioration in new pastures after the first two or three years.' He then goes on to give those which in his experience and from practical test and analysis are the best grasses :—'The five coarse grasses, valuable beyond all others for permanent pastures, are cocks-foot (Dactylis glomerata), meadow fescue (Festuca pratensis), and its ally tall fescue (Festuca elatior), timothy (Phleum pratense), and meadow foxtail (Alopecurus pratensis). These five grasses should form the bulk of all pastures on good soil, either for sheep or cattle. The finer or minor grasses are crested dogstail, hard fescue, rough meadow grass, florin, sheep's fescue, and golden oat grass. A meadow composed of the above would be perfect as regards grasses, assuming that the proper proportions were used, and would produce food for stock during nearly every month of the year. The clovers, which, however, should be used in much smaller proportions than the grasses, are permanent red clover, cow grass, alsyke, and white or Dutch clover. Seeds of milfoil or yarrow ought never to be omitted.' Again: 'The grasses most pernicious to newly-formed pastures are first and principally rye-grass in all its varieties, and Yorkshire fog, or soft, woolly grass.' Now, everyone knows that at least three-fourths of our pastures consist of these two latter. Practically speaking, as far as we are concerned, most of these grasses are out of our reach. They have to be imported from England, and even then the percentage of seeds germinating is small, and the voyage out reduces that percentage so much that, until we can get them locally grown, they are too expensive to be thought of. As I pointed out in my former letter, however, we have two of the principal within our reach—*viz.*, cocksfoot and timothy. The seeds of crested dogstail and yarrow do not suffer so much from the voyage, so a little of these might be included in our mixture. The percentage of germinating seeds in foxtail is only 20, which on an average is reduced by the voyage to five, so that the cost of one pound of that grass which would grow, assuming the cost to be one shilling—it is generally more—would be £1. Now for the test of analysis. The best authority we have is Sinclair, who was gardener to the Duke of Devonshire. His book, *Hortus Gramineus Woburnensis*, was published, I think, at the end of last century, but the analysis of the different grasses was carried out by a man of eminence, Sir Humphrey Davy. I will give the result of their experiments in the three grasses, cocksfoot, timothy, and rye-grass. Cocksfoot, when cut on April 15, weighed at the rate of about 10,209lb. per acre, which afforded about 1,190lb. of nutritive matter. At the time of flowering, the green produce was equivalent to 27,905¼lb., which lost in drying nearly 16,045lb., and produced only 1,089lb. of nutritive extract. At the period of ripening its seed, a reduction in weight equal to 1,361lb. per acre, had taken place which yielded an increase in dry hay at the rate of 1,413lb. in nutritive extract—about 363lb. The advantages, however, were more than counter-balanced by a deficiency in the quantity of the aftermath. Timothy, grown in a clay loam, produced when flowering at the rate 40,837lb. of grass per acre, which lost 23,481½lb., or little more than half its weight, in drying and its nutritive extract in the same period was equivalent to about 1,595lb. per acre. At the time of seed-ripening, no change worth mentioning had taken place in the weight of its green produce, but the loss in drying then only amounted to about 21,440lb., while the nutritive extract had increased to 3,669lb., which anomaly is of greater importance to the seed grower than to the grazier, as the increase is fully counter balanced by the deficiency of the aftermath. Rye grass, grown on a rich, brown loam, at the time of flowering was equivalent to about 7,827lb. of grass, 3,389lb. of hay, and 305lb. of nutritive extract per acre, and the proportional value which the grass at time of flowering bore to that of time of seed ripening was as 11 to 10, and to the grass of the aftermath as five to two.' Although these experiments were crude according to later ideas, they are sufficient to show how far behind rye grass is:—

	Lb. nutritive matter at time of flowering.	Lb. nutritive matter at time of seed-ripening.
Cocksfoot	1,089	1,452
Timothy	1,595	3,669
Rye grass	305	277

Whatever one's opinion may be of ryegrass, however, there is no doubt that under certain conditions, in this country it flourishes in an amazing way on such lands for instance as the Napier plains, or in the alluvial flats on our coast. From my own experience I am inclined to favour cocksfoot on dry hills, and timothy on wetter lands. On some fern hills I burnt, I sowed and harrowed cocksfoot, and there is as close a sward as I could wish, although it has been down eight years. On a piece of low-lying land with clay subsoil, I sowed 12lbs. of timothy nine years ago, and it is better now than ever it was. On another piece of similar land I sowed principally ryegrass, about six years ago, and the result is most unsatisfactory. On the other hand ryegrass, by the use of stimulants, may be made to grow more quickly than any other grass, owing to its shallow root. On Woodendean, the late Major Willis used 3cwt. per acre of bones, and the following year 2cwt. of superphospate, and although the grass was very inferior before this, when he cut it for hay it threw an amazing crop—as heavy as any I ever saw, and the pasture is still good. The following is Mr. De Laune's opinion of cocksfoot:—'Cocksfoot is by far the most valuable of all grasses, because it grows on all soils; it produces the greatest amount of keep; it is the most nutritious grass, and seems to grow faster and stronger in extremes of weather, either wet or dry, than any other grass. There is, moreover, hardly any stage of its growth in which sheep do not eat it greedily, and its flower heads appear to me to be specially nutritious to all kinds of stock, young or old, in excessively wet weather.' Cocksfoot has no chance of seeding unless there is a great abundance of it and the stock are running light. It is often objected to as it is said that stock pull it up by the roots, but it will be observed that it is not the centre root but the side shoots which are lying on the ground. Cocksfoot is different from the other permanent grasses after being mown, and its long leaves may be invariably observed whenever it is present in a meadow after it has been mown for hay. On this account it is extremely objectionable for lawns. Timothy or catstail commences to grow as early as cocksfoot in the spring, and bears feeding off remarkably well, as it seems to produce as heavy a crop in summer after having been fed off in the early part of May as it would have done had it not been touched. Like cocksfoot, it is never allowed to seed by stock, and its flower-heads are extremely grateful when the seed is ripe to both old and young stock. This grass is much objected to by many on account of its apparent coarseness, but as all kinds of stock like it, there is no force in this objection. The aftermath of this grass does not appear so strong in growth as that of either foxtail or cocksfoot. Crested Dogstail.—'When it abounds in too large a proportion, it does not do to lamb early, as the land will not yield early grass.' It will also be found that where stock fatten admirably chiefly on this grass about midsummer, they rapidly fall off if left in the pasture after the dogstail is ripe. 'Yarrow is a herb that sheep especially like, and however great may be the quantity in a meadow, it is rare to see it in blossom where sheep are. Cattle have not such a predilection for it as sheep, but before autumn comes it will be found closely eaten.' Of rye-grass, he says, in a paper read at Canterbury (England) before a farmers' club:—'The most important conclusion I have arrived at is the necessity of discontinuing to sow that popular grass, rye-grass, and of getting rid of it from our pastures. I have never been able to see that it has any merits beyond its early abundance and great capacity for bearing fertile seed. My own observation leads me to condemn it absolutely, but, in condemning it, I am aware that I have opposed to me some great modern authorities, amongst whom are Sir J. B. Lawes, in Hertfordshire, and Sir Kenneth Mackenzie, in Rosshire.' And again, 'It was only by constant and continuous observation that I arrived at the conclusion that it was the cause of so much evil, and I have learned to dislike its presence more than thistles. I assure you, gentlemen, I detest the sight of it.' Dr. Voelcker, chemist at the Royal Agricultural College, Cirencester, whom he calls 'one of the most scientific, and one of the most practical agriculturists in the world,' writes to him thus:—'Rye-grass is a very rank feeder, and gives the better kind of grasses and clovers a poor chance to grow well when it has once taken possession of the ground. In my opinion, the less rye-grass there is in the mixture of seeds intended for permanent pastures, the better will be the produce taking all things, quality as well as quantity, into account.' I lately read an American book on grasses by Mr. Fint. This writer spoke highly of cocksfoot, timothy, and red-top (Agrostis vulgaris), which is peculiar to America, but said that American farmers sowed down with timothy and red-top. Ryegrass, he says, does not find favour. You will see, I think, from all the foregoing that if we wish to have good pastures we must give up sowing ryegrass, which unfortunately for us, is what we have hitherto been depending on. As for myself. I shall, in the future, sow 20lb. of cocksfoot, 10lb. of timothy with some clovers, per acre, and, although I cannot expect to have such pastures as Mr. De Laune has at Shasted-court, still I am convinced that it will be a great improvement on those I have already sown. I should like to have added a few remarks upon turnips, and upon artificial manures, but I have already trespassed too much on your space. I hope to do so at some future time.—*Australasian.*

HOP BEER.

MY. DEAR "HUMMING BEE,"—Seeing under the above heading that you desire a receipt for making the same, I will endeavour to instruct your many readers upon the subject. I have observed that you kindly gave many receipts before, which, with ordinary intelligence, should have been sufficient. Permit me, however, to say that your last receipt, on the 7th instant, was not hop beer at all, but "small beer." It was a regular "brew," and, the fermentation being perfected, an alcoholic beverage, and its strength in that dangerous and pernicious poison would just be in proportion to the saccharine used and decomposed in the shape of malt sugar, or sugar proper. Now, hop beer, as generally understood, is very different from this; it is innocent, mild, refreshing, somewhat invigorating (not stimulating), a little nourishing in proportion to the sugar preserved, and the hop bitter also a little tonic; in fact, it resembles the simple beverage, of which we have record in history. We know that hops were introduced into England in the reign of Henry VIII. There is an old rhyme which runs thus—

> "Hops, reformation, and beer
> Came into England all in a year."

We read that this hop beer was brewed and drank so fresh that it was delivered at the houses as fetched from the brewery fresh every day, and well would it have been for the race had they kept to this simple beverage. We see, then, that it should be fresh, and, therefore, free from alcohol. It should only "work" just sufficient to generate a little carbonic acid gas, and not to destroy the entire sweetness. You have given in your various receipts the principle to work upon. Quantities cannot well be given, as tastes differ so much; some like it sweeter than others: others more hop bitter. I think sugar preferable to malt, as being more simple and quickly prepared, and does not require so much "fining." Therefore, take liquorice water to taste, and to taste decoction or extract of hops, which can be prepared and kept on hand to save time. Heat to nearly milk warm, then add a *little* yeast; let "work" quietly in a mild temperature for about 48 hours, then fine with isinglass or prepared gelatine, and if colour is desired add a little burnt sugar. It then should be bottled and tied down, and it is almost fit for immediate use. Keep in a cool place. It can be flavoured to taste with ginger, lemon, &c. It should not be kept in cask on draught, as contact with air would generate further fermentation, and spoil it. It would also be in danger of running into alcoholic fermentation, then very soon into the acetous. This should be particularly avoided. There is an "unfermented Burton ale" extensively used in England, which gained the £1,000 prize of the "Church of England Temperance Society." In conclusion, it is gratifying to know that the tendency of the age is to go back as near as possible to Nature's only menstruum and solvent, pure water, or flavoured only with Nature's beautiful and varied syrups of fruit, which for ages have been destroyed by fermentation, the product of which, alcohol, has been or is playing sad havoc in the world.

King River, Oxley, February 10. E. H.

—*Australasian.*]

THE BOTANIC GARDEN.

THERE are several flowers in bloom near the entrance to the Garden which deserve a passing notice. One of these is the graceful Nierembergia, a specimen of which may be seen at the left-hand corner of the main walk facing the Director's residence. It will be readily recognised by its resemblance to the flower of the potato-plant, of which indeed it is a near relation. Both belong to the Nightshade family (Solanaceæ), of which a still prettier member is the Solanium jasminoides whose five-cleft corolla of delicate lilac and ornamental fluted column of yellow-coloured stamens surrounding the elegant style, may be seen entwined round a China rose-bush at the corner of a bed not far from the conservatory and facing the splendid Demerara pine. The nightshade family—of which there are about seventy genera and over a thousand species, mostly inhabiting the tropics—is noteworthy for the fact that about one-half of its members are poisonous, and the remainder either innocuous or even nutritious. The family has been separated into two divisions mainly on that account. To the one division belongs the potato, and to the other the tobacco plant and the deadly nightshade. The flowers in this order are mostly isomerous, *i.e.*, they have the same number of sepals and petals, and in nearly every case of stamens as well. Besides the potato this order furnishes our native races with the gunyang, or Australian potato, obtained from S. vescum; Tasmania with the kangaroo apple, the fruit of the S. laciniatum; the East Indies with chillies, the Mexican name for the fruit of the capsicum; Canada and this colony with the tomato; the Cape of Good Hope with a gooseberry, and Peru with a winter cherry. The light-purple tubular flowers of the Jochroma shrub, near the the bauhinia tree, opposite the workmen's yard, also belong to a member of this interesting family. Near the the entrance of the Garden, and indeed, scattered throughout the grounds and to be met with all over Adelaide, is the pretty little fine lobed corolla of the vinca, or periwinkle, as it is called at home. Though so common a flower it is none the less deserving of observation. It belongs to the same family as the oleander, of which this colony seems to possess a greater number than even Italy itself. Like the nightshade family, the dogbane family (Apocynaceæ) is extremely poisonous. Notwithstanding its beauty, the common oleander is one of the worst of the lot, and many children in Adelaide have probably owed their death to their fondness for its flowers. A peculiarity about them is the long feathery appendages by which the anthers are terminated, and it is worth while pulling the flower to pieces for the sake of observing the strongly fortified position of the fine stamens entrenched round the pistil as if determined to protect it. The famous Tanghin poison, formerly used in Madagascar as a criminal ordeal, was furnished by the seeds of a member of this order (Cerbera Tanghin), and an East Indian species of the same genus—with long yellow, sweet-scented corolla and unmistakable oleander-like leaves—adorns the lawn opposite the workmen's yard. A striking peculiarity about this flower is the apparent absence of any reproductive organs, the long tubular corolla being seemingly quite empty. On stripping the corolla, however, and pulling back the remnants of the petals at the base of the tube, the whole arrangement will suddenly spring into view like a *Jack-in-a-box*. This order also furnishes South Africa with the famous Komlee arrow poison, while a species at the Cape is used as a poison for fish. *Dogbane* shrubs are generally noted for their acrid milk-juice, but in one case—that of the cow tree of Demerara—the juice makes a tolerably good substitute for the real thing.—*Australasian.*

WHAT IS THIS DISEASE THAT IS COMING UPON US?

LIKE a thief at night it steals in upon us unawares. Many persons have pains about the chest and sides, and sometimes in the back. They feel dull and sleepy; the mouth has a bad taste, especially in the morning. A sort of sticky slime collects about the teeth. The appetite is poor. There is a feeling like a heavy load on the stomach; sometimes a faint all-gone sensation at the pit of the stomach which food does not satisfy. The eyes are sunken, the hands and feet become cold and feel clammy. After a while a cough sets in at first dry, but after a few months it is attended with a greenish coloured expectoration. The afflicted one feels tired all the while, and sleep does not seem to afford any rest. After a time he becomes nervous, irritable, and gloomy, and has evil forebodings. There is a giddiness, a sort of whirling sensation in the head when rising up suddenly. The bowels become costive; the skin is dry and hot at times; the blood becomes thick and stagnant: the whites of the eyes become tinged with yellow, the urine is scanty and high-coloured, depositing a sediment after standing. There is frequently a spitting up of the food, sometimes with a sour taste, and sometimes with a sweetish taste; this is frequently attended with palpitation of the heart; the vision becomes impaired with spots before the eyes; there is a feeling of great prostration and weakness. All of these symptoms are in turn present. It is thought that nearly one-third of our population has this disease in some of its varied forms. It has been found that medical men have mistaken the nature of this disease. Some have treated it for a liver complaint, others for kidney disease, etc., etc., but none of the various kinds of treatment have been attended with success, because the remedy should be such as to act harmoniously upon each one of the organs, and upon the stomach as well: for in Dyspepsia (for this is really what the disease is) all these organs partake of this disease, and require a remedy that will act upon all at the same time. Seigel's Curative Syrup acts like a charm in this class of complaints, giving almost immediate relief. The following letters from chemists of standing in the community where they live show in what estimation the article is held:—

John Archer, Harthill, near Sheffield:—I can confidently recommend it to all who may be suffering from liver or stomach complaints, having the testimony of my customers, who have derived great benefit from the Syrup and Pills. The sale is increasing wonderfully.

Geo. A. Webb, 141, York-street, Belfast:—I have sold a large quantity, and the parties have testified to its being what you represent it.

J. S. Metcalfe, 55, Highgate, Kendal:—I have always great pleasure in recommending the Curative Syrup, for I have never known a case in which it has not relieved or cured, and I have sold many grosses.

Robt. G. Gould, 17, High-street, Andover:—I have always taken a great interest in your medicines, and I have recommended them, as I have found numerous cases of cure from their use.

Thomas Chapman, West Auckland:—I find that the trade steadily increases. I sell more of your medicines than any other kind.

N. Darroll, Clun, Salop:—All who buy it are pleased, and recommend it.

Jos. Balkwill, A.P.S., Kingsbridge:—The public seem to appreciate their great value.

A. Armstread, Market-street, Dalton-in-Furness:—It is needless for me to say that your valuable medicines have great sale in this district—greater than any other I know of, giving great satisfaction.

Robt. Laine, Melksham:—I can well recommend the Curative Syrup from having proved its efficacy for indigestion myself.

Friockheim, Arbroath, Forfarshire, Sept. 23, 1882.

Dear Sir,—Last year I sent you a letter recommending Mother Seigel's Syrup. I have very much pleasure in still bearing testimony to the very satisfactory results of the famed Syrup anp Pills. Most patent medicines die out with me, but Mother Seigel has had a steady sale ever since I commenced, and is still in as great demand as when I first began to sell the medicine. The cures which have come under my notice are chiefly those of liver complaint and general debility.

A certain minister in my neighbourhood says it is the only thing which has benefited him, and restored him to his normal condition of health after being unable to preach for a considerable length of time. I could mention also a great many other cases, but space would not allow. A near friend of mine, who is very much addicted to costiveness or constipation, finds that Mother Seigel's Pills are the only pills which suit his complaint. All other pills cause a reaction which is very annoying. Mother Seigel's Pills do not leave a bad after-effect. I have much pleasure in commending again to suffering humanity Mother Seigel's medicines, which are no sham. If this letter is of any service, you can publish it.

Yours very truly,
(Signed) WILLIAM S. GLASS, Chemist.

A. J. WHITE, Esq.

15th August, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.

Yours truly,
(Signed) N. WEBB,
Chemist, Calne.

Mr. WHITE.
(B)

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Crop and Weather Report.

[For the Week ending the 15th April 1885.]

General Remarks.—Slight showers have fallen throughout the Madras Presidency, Mysore, in several districts in Bombay, and the Central Provinces. In the North-Western Provinces and Oudh and the Punjab rain has fallen in a few districts. Light rain is also reported from some of the Central India and Rajpootana States. In Bengal there has been rain in some districts, and in Assam the fall continues to be generally heavy.

In Madras the standing crops are generally in fair condition, but in Mysore prospects are reported to be still uncertain. In Coorg rain is much wanted for the coffee blossoms.

The *rabi* harvest has been nearly completed in most districts in the Bombay presidency, and preparations for the *kharif* have commenced in places. Scarcity of drinking-water continues to exist in parts of Dharwar and Belgaum, and of fodder in parts of Dharwar.

In Central India and Rajpootana harvesting is going on, and prospects are generally good. The *rabi* harvest has commenced in the Punjab and promises well. In the North-Western Provinces and Oudh and the Central Provinces harvesting, threshing, and winnowing are in progress. In the former an average outturn is expected.

In Bengal the *rabi* harvest, which has been nearly completed, has yielded a good outturn on the whole. Ploughing is in progress and sowing of early paddy and jute has commenced in some places. Ploughing and sowing continue in Assam, and prospects are generally favourable.

Cholera and small-pox are reported from parts of Madras, Bombay, Bengal, the North-Western Provinces and Oudh, and British Burmah, otherwise the public health is generally good.

Prices are fluctuating in Bengal and the Punjab : elsewhere they are generally stationary.

Madras.—General prospects fair, except in parts of Bellary and Anantapur.

Bombay.—Slight rain in parts of eleven districts. *Rabi* harvest completed or nearly so in most districts ; *kharif* preparations commenced in parts of Sholapore and Dharwar ; wheat and peas slightly injured by rust in parts of Shikarpore, and cotton and *juari* by rain in one taluka of Belgaum. Scarcity of drinking water in seven talukas of Dharwar, and three of and Belgaum, of fodder in three talukas of Dharwar. Fever and cattle-disease in parts of nine and cholera and small-pox in parts of eleven districts.

Bengal.—Slight rain fell in some districts, but more rain is much wanted generally. Ploughing is going on, but is retarded in certain districts for want of rain ; harvesting of *rabi* crops is nearly finished with a good outturn on the whole ; early paddy and jute are being sown in a few districts ; harvesting of *boro* paddy has commenced in two districts. A storm which occurred on the 29th ultimo in the district of Tipperah greatly damaged property and caused some loss of life. Prices of food-grains show a slight advance in a few districts, otherwise they are stationary. Sporadic cases of cholera and small-pox are reported.

N.-W. Provinces and Oudh.—Slight showers have fallen in some districts. Harvesting operations approaching completion ; an average outturn expected. Markets are well supplied and prices steady. Public health fair ; some cases of cholera reported from Benares, Agra, Jhansi, and Aligarh.

Punjab.—Rain in the Sialkot, Rawul Pindee, Shahpore, Dehra Ismail Khan and Peshawur districts. Health good. Crops in the Peshawur district damaged by excessive rain and hail storm, elsewhere prospects are on the whole good. Prices fluctuating.

Central Provinces.—The weather has been very variable with frequent thunderstorms and much cloud at times. *Rabi* harvesting continues in the northern districts, where the outturn of wheat is proving less than was anticipated owing to the mildew which resulted from the rain of January and February last.

British Burmah.—Cholera prevalent in parts of Amherst and Shwegyin districts ; small-pox prevalent in parts of Tharrawaddy, Hensada and Thayetmaye districts, otherwise public health good ; cattle-disease in Thayetmaye district. Weather sultry ; symptoms of south-west monsoon.

Assam.—Weather rainy and cool. Sowing of *aus* crop almost over ; ploughing for *dumahi* and *murali* crops continues ; *Ahu dhan* being sown, prospects good. Public health fair.

Mysore and Coorg.—Paddy crop is ripening ; coffee blossom out, but more rain wanted. Prices stationary. Prospects of season and public health good.

Berar and Hyderabad.—Weather hot and cloudy. Threshing of *rabi* continues in places ; *kharif* preparations in hand, reaping of *tabi* has commenced. No sickness among men and beasts.

Central India States.—Weather cloudy. Health good. Harvesting continues.

Rajpootana.—Health good. *Rabi* harvest operations in progress. Weather cloudy. Prices show tendency to fall.

Nepal.—Weather hot and dry. The spring crops are poor from want of rain.

Editorial Notes.

There was a time, and not long ago, when the Indian cotton trade with Eastern Africa, and especially Mozambique, was in a most prosperous condition. Mr. Holmwood, while recently addressing the Society of Arts in London, pointed out that a remarkable demand had at one time risen in Mozambique in favour of Indian cottons. The reason why they found favour with the natives was, that they combined durability with cheapness, and the way in which the trade rapidly developed, it seemed as if cottons from India were destined at no distant date to monopolise the market. But a difficulty then arose in the way of the Indian exporter in the *Mozambique* tariff, which levied duty on cotton cloths by weight, thus treating coarse cheap Indian fabrics very unfairly in comparison with the finer kinds. Notwithstanding this heavy handicap, the trade still continued to flourish, until 1882, when a special tax was placed upon Indian cotton. The object of this could have been nothing less than the shutting out of the article altogether from the marts of Eastern Africa, and a heavy blow dealt to the trade. But before the worst could be accomplished, the English Foreign Office stepped in, and its interference put a stop to such high-handed proceedings. It is true the obnoxious tax was repealed, but rather late, as the mischief had been done, and several firms which had opened branch firms at Mozambique, had already closed them, before the results of the interference of the Foreign Office were known. Now, however, no reasons exist why the Indian cotton trade should not be restored to its original status, and regain the position which it held before the imposition of this special tax. The Foreign Office having once interfered successfully, it might go a step further and demand a fair treatment for it. There is great injustice in taxing cheap and coarse cotton at the same rate as finer cloths, and as the Portuguese officials cannot or will not understand this, some pressure should be brought to bear upon them to perceive the inequitableness of such proceedings.

⁂

The cultivation of cacao in Ceylon has not, we find, been attended with any marked degree of success. The plant is subject to the ravages of a deadly enemy in the earlier stages of its growth—we refer to the insect (a bug) known to entomologists by the name of *Helopeltis Antonii*. This little pest is provided with a formidable proboscis in the shape of a pumping machine, by which it sucks out the juice of the tree. Any tree on which it fastens is sure to perish. These pests hunt in packs.

Mr. Martin has contributed a paper on the cacao, in which he suggests various methods of destroying this insect, notably that adopted by Dr. Friemen and others, *viz.*, that of destroying the insect by collecting it in its various stages. The suggestion about burning affected branches and pods is a good one, but liable, in some measure, to cause injury to the trees. Burning should only be resorted to in extreme cases.

⁂

It is matter for regret that this valuable plant should be subject to a scourge like the *Helopeltis*, but according to Mr. Martin, the cultivation of cacao in Ceylon may yet be attended with success. Those who have invested capital on it, must naturally be somewhat disappointed; and we can only hope that means will be discovered of ridding the cacao of its enemy.

⁂

The cultivation and export of tea from Ceylon seems to be making headway, and there is every reason to anticipate that it will take a prominent place in the tea market. The falling off, which has lately been observable in the cultivation of coffee in Ceylon, has given place to an extraordinary impetus to tea plantation.

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Thus we find that the exports of tea during the past year exceeded a million pounds. The exact figures quoted up to the 26th March last, were 1,010,255lbs. against 612,388lbs. to the same period last year. These figures, it will be observed, show a marked rise.

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Last year there were shipped altogether 2,262,000lbs., and the quantity estimated to be shipped this year is 3,500,000lbs. This speaks much for the enterprise of Ceylon Tea Planters. The quality of the tea is, we are glad to observe, all that can be desired.

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A **very** interesting report has just been submitted to the Chief Commissioner of British Burmah, by Mr. R. Romanis, Chemical Examiner to the local Government, on the oil well and coal in the Thayetmyo district. The oil-wells are at Padaukpin, about eight miles from Thayetmyo on the Mindon road. Of seven wells there are only three kept in repair, and of these only one was yielding oil at the time of his visit. The oil flows very slowly; the produce is only one barrel monthly. It occurs in fissures in a hard blue shale (dipping 35 *deg.* W.), which contains fossil marine shells, which are generally much decomposed by the action of water; often there is only the cast of the shell in the clay remaining. At Yenanchaung in Upper Burma the oil-bearing stratum is a similar blue shale with bands of sand, into which the oil diffoses from the shale and through which it percolates in the wells. The shale at Padaukpin seems almost impervious. He observed a place where the shale cropped up to the surface. It was converted superficially into clay by the action of water. The oil was found lining small cracks and cavities. When a piece of the shale was powdered and diffused through water, the oil came to the surface in a thin film. A specimen of the shale was analysed and found to contain 0·16 per cent of oil. The rocks overlying the oil-bearing stratum appear much harder than those at Yenanchaung. It appears to be a different geological formation, deposited under different conditions. A boring was put down to a great depth some years ago in one of the ravines to the northward. It ended in hard rock, without finding oil. He did not know why the place in question was selected; the whole district was very unpromising.

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The coal is found in a ravine of the south-western spur of the second, or middle hill of the group of lime-hills south of Thayetmyo. When he visited the place, an escarpment had been made along the east side of the gorge; at the north end a drift had been driven into the hillside through a hard blue shale to a depth of about 20 feet; at the end of the drift there was a thin seam of coal and carbonaceous shale dipping at an angle of about 30°. Below this another drift had been made, but had fallen in. The seam of coal is said to be four feet thick. Further south, again, a pit had been sunk to a depth of 30 feet, following the course of two small seams of coal here dipping at an angle of 75 to 80 deg. They are four feet apart at the top, but gradually approach and will unite probably three or four feet lower. Five or six yards further south there were seen two more vertical beds of carbonaceous shale. One of these is said to be the seam worked about 30 years ago. The traces of the old workings are now concealed under the rubbish thrown down from the escarpment above. The old drift is said to be vertically below the limekiln on the hillside. The blue shale below the coal is full of vegetable remains, apparently grasses or reeds. Above the coal the shales appear to be unfossiliferous. Over the shales are sandstones. Above these again, there is a greyish pink limestone; then over all, forming the crest of the hill, is a white limestone composed of fossils, nummulites, and marine mollusca. It seemed to him that the coal deposits of the Arakan Yoma have been formed in the swamps and lagoons of a river delta. Similar deposits of very recent date were found in the neighbourhood of Rangoon. Thus at Insein a boring showed a thin bed of lignite. Beneath the alluvial soil, on which part of the town of Rangoon stands, there is a stratum of decomposed vegetable matter about two feet thick, thinning out and disappearing where it meets the sandstones, on which the cantonment stands. Above this stratum there is a fine blue clay; above the clay is the sandy clay of the rice-fields. The same order exists at each of the coal outcrops in Burmah,—argillaceous sandstones, blue shale, coal. At Thayetmyo the deposits have evidently been formed while the land was slowly sinking beneath the sea, the limestones overlying the shales and sand-stones having been deposited on a sea bottom, when the head of the Gulf of Martaban was at Yenanchaung or Sagaing. The sudden change in the angle of dip shows that there has been a great disturbance of the strata. It seemed to him that the coal worked 30 years ago was a portion of the present four-feet seam, and that a fault runs between the main hill and the southern spurs; but Mr. Lewis, who is carrying on the work, seems to think that the old drift was driven in the wrong direction, and that he will find the seam at the bottom of the pit he is sinking. On this theory there should be two seams four feet thick, separated by 60 or 70 feet of shale It is noteworthy that a similar nummulitic coal-field by the banks of the Indus has just been carefully tested by boring, and found to be so irregular as to be worthless.

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The following is a summary of Messrs. William, James and Henry Thompson's fortnightly Circular on Indian Tea. Since the 12th instant 40,000 packages have been catalogued for sale, including 700 of Ceylon and 2,000 of reprinted tea. The subsidence of the excitement in the country, and the extra supplies brought to market in consequence of the improvement in prices have checked the activity of buyers, and the sales have passed quietly, but without any flatness of tone. Demand has continued strong for all the better qualities, especially for fine Pekoes and Broken Pekoes, at firm to rather dearer prices; but for inferior grades between 8*d.* and 1*s.* 2*d.*, upon which the improvement was most marked, prices have receded, and fully ½*d.* of the recovery has been lost. During the first 20 days of this month duty was paid in London upon 17,500,000 lbs. as compared with 8,500,000 lb. in 1884, and some of the dealers think the increased rate will be maintained up to the date of the Budget. This of course entails a financial strain of which the effect will be felt for many weeks to come, and which must contract the volume of business until the surplus duty-paid stocks are worked off.

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We hear from Australia that the wine industry is now passing through a critical stage of its existence. A pastoral paper writing on the subject remarks that its progress has varied considerably during the past ten years, but at no time has there been such a visible depression as there exists in it at the present. In the Upper Murray, which is one of the principal sources from which the supplies are drawn, and where the tone of the market of the world is always indicated by the financial condition of the producers, the industry is apparently in a depressed state, but whether it is on account of the immensely increased quantity of the produce, or whether it is an extraordinary diminution of the demand, the experience of the next few years only will demonstrate. Ten years ago the present stagnation was approached, and at that time a mild description of panic set in which resulted in the rooting-out of some vineyards, the neglect of others, which necessitated years of labour to recover them from the damage sustained, and a decided indication on the part of buyers and speculators in the matured article, or the immatured must, to hold temporarily aloof from further operations. In the course of the next two years, however, there was an evident revival. Those who had neglected their vineyards went vigorously to work to revive them, and those who had rooted their vines out when under the impression that the industry had collapsed set to work, and planted out larger areas than they had ever wrought previously. Hundreds, and probably thousands, of acres were trenched and vines planted out; the demand increased to a remarkable extent; and although the prices never recovered their former level, the supply for a time did not satisfy the demand; but latterly this activity has given strong indications of having arrived at its maximum height. In Albury, for instance, where the trade naturally gravitates on the New South Wales side of the Murray Valley, most of the cellars are heavily stocked; and in one of them there is no less than 350,000gal. of wine at the present time. The same firm has a stock approaching 100,000gal. stored at their export branch in Sydney; and they anticipate obtaining a return of from 80,000 to 100,000 from the vintage which is just about commencing. With such a stock in hand it cannot be expected that they will be prepared to operate to any great extent during the present season; and as they were the principal buyers in past years, the fact of their ceasing to operate will have a depressing if not a disastrous effect upon the prospects of the smaller growers, who looked up to them as a source for the absorption of their produce. The same, in a minor respect, may be said of all the other buyers on both sides of the river within 40 miles below Albury. Many of the buyers in and about Rutherglen, Brown's Plains, and Barnawatha, who, at one time, were in the habit of purchasing grapes from the New South Wales side of the river, and converting them into wine on the other, are not disposed this year to speculate; and this fact, together with those previously stated, has placed the small producer in a rather awkward predicament. Many of them are unable to make the necessary preparations for the disposal of their produce owing to the near approach of the vintage; others have no casks, and are unable to obtain them in sufficient quantities to store the quantities anticipated; and others look upon the present evidences of depression as a clear loss of the present year's yield. To the small vigneron the deprivation of the usual outlet for either his grapes or must means a considerable loss, even if he had the storage capacity in the shape of casks, because few of them have the necessary experience to mature their wines sufficiently well to enable them to successfully enter into competition with the expert hands engaged by the large buyers; and even if they could do so their only market failing Albury is cut off from them by the prohibitive duty of 6s. per gallon imposed on wine made in New South Wales and exported to Victoria. Taking all the circumstances into consideration, the outlook for the wine industry this year is not a satisfactory one for the producers, and it may be safely asserted that the returns in the shape of cash this year will fall very considerably short of what was anticipated.

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A CORRESPONDENCE just published by the Government of Madras on the subject of the manufacture of muslins throughout the country has brought to light the fact that only in three places in all India is the industry carried on to any extent. These are Arani in the Chingleput District, Chicacole in Ganjam, and Dacca in the Bengal Presidency. From elsewhere the replies received by the Madras Government have been that muslins are not manufactured at all. Here and there muslins of small size, low price and evidently of inferior quality, are said to be turned out. The Deputy Commissioner of Bandora states that "the art of spinning fine thread, such as that noticed in Chanda before the settlement in 1863, has died out, and the finest yarns now used are all machine-made, and some of them are muslin numbers. The opening of the railways and the introduction of Europe goods with the coincidence of the 1868-69 famine and a brisk demand for cotton from the Berars draw away most of the thread-spinners to the Berars." Mr. Price, the Collector of Chingleput, is of opinion that the English yarns have spoiled the native cotton spinner's trade, that spinning the exquisitely fine thread, used for native muslins, has thus died out, and that this has led to the reply that no muslins are manufactured in any other parts of India. From the detailed statement appended to the Collector's letter, it appears that the cost of Arani muslin varies from Rs. 50 to Rs. 200 per piece of 48′ × 4′.6″, while the cost of that woven at Dacca runs from Rs. 150 to Rs. 275 per piece of 60′ × 3′. Considering the extraordinary fineness of the best description of Dacca muslin, the Madras Board of Revenue do not consider the price exorbitant, though it is very possible that the cost price of the second class and coarser muslins of Dacca may have been exaggerated owing to over-estimation of the time required to weave them. The production of ten yards of the fairy-like texture which will pass through a ring represents a year's labour of two weavers, but the same cannot be said of the coarser qualities. It is said to reflect on the decline of a trade which has flourished for centuries, for the products of the Dacca loom were appreciated by the Greek and Roman ladies hundreds of years before the Christian era.

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A CORRESPONDENT says:—The attention of paper-makers is directed to a new raw material, which is derived from the trunk and branches of the yucca, the leaves of which yield fibres suitable for ropes, strong sacking, brushes, &c. The yucca, which in northern climates is merely a shrub, grows in Honduras to a height of upwards of forty feet, the trunk being about thirty-six inches in circumference, and with the exception of the outer bark, the whole of the tree is composed of fibre suitable for paper manufacture. It is found most abundantly on the Atlantic coast of Honduras, where the yucca attains its largest growth, and owing to the local rivers being navigable and flowing into the Atlantic Ocean, every facility is afforded for its continuous and economical shipment to the ports of the United Kingdom. The yucca trees in these *valleys will yield several cwt. of fibre to each tree, of a quality which will produce over ninety per cent of its dry weight as* paper stock of excellent quality. It is easily reduced, a short alkaline boiling prepares it for the beating engine, and being readily bleached, the cost for chemicals is reduced to a minimum. The papers produced are strong and of fine texture, equal in quality to any description made from linen rags, and possessing the natural advantage of taking black or coloured inks both rapidly and clearly, thereby rendering such papers especially suitable for use in the fastest newspaper machines, as well as for the production of impressions from engravings, whether upon steel, copper, or wood, the results being equal to those obtained with India paper.

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THE total imports of rag and paper-stock at the port of New York during the month ended January 31, as reported, were 40,510 bales, an increase over the corresponding month of last year of 12,313 bales; and an increase, compared with January, 1883, of 26,981 bales. There was an increase from last year in rags of 10,768 bales. Manilla stocks show a decrease of 412 bales, and old papers a decrease of 13,666 bales. Wood pulp itself shows an increase of 3,323 packages. The total figures in each class of stock, during the month of January for the years 1885, 1884, and 1883, are as follow:—

	1885.	1884.	1883.
Rags	24.981	14,213	9,503
Old papers	1,440	2,806	1,772
Manilla stocks	4,954	5,366	2,254
Wood pulp	9,135	5,812	...
Total ..	40,510	28,197	13,520

The arrivals from the different ports were as follow: Amsterdam, 209 bales rags; Antwerp, 1,806 bales rags; Aspinwall, 217 bales rags; Bremen, 991 bales rags, 100 bales manillas; Bristol, 183 bales manillas; Calcutta, 980 bales rags; Cadiz, 491 bales rags; Copenhagen, 898 bales rags, 6,800 bales wood pulp, 36 bales manillas ; Dundee, 317 bales rags, 89 bales old papers, 1,316 bales manillas ; Genoa, 97 bales manillas ; Glasgow, 136 bales rags, 76 bales old papers ; Hamburg, 3,767 bales rags, 103 bales old papers, 325 bales manillas ; Havana, 95 bales rags ; Hull, 7,258 bales rags, 35 bales old papers, 735 bales wood pulp, 203 bales manillas ; Liverpool, 581 bales rags, 39 bales old papers, 1,369 bales manillas ; and London, 46,946 bales rags, 813 bales old paper, 1,046 bales manillas ; Newcastle, 86 bales rags, 1,600 bales wood pulp ; Rotterdam, 843 bales rags, 285 bales old paper, 283 bales manillas ; Pillau, 1,545 bales rags, and St. Jago, 58 bales rags.

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In expressing surprise that the Bombay mill-owners do not seem to be aware of the fact of Persia's demand for cotton manufactured goods being supplied by England, and not India, an Ispahan correspondent writes :—" The connection by trade between Persia and India dates from very ancient times, when each supplied its own want with the products of its hand looms and those of its agricultured industries, and exchanged their surpluses with one another. Armenian merchants from Julfa (in Ispahan) were, it is believed, among the first foreigners who explored the channels of trade in Hindustan, and their commercial enterprise repaid them with boundless wealth. This enabled them to construct in their palmy days the Armenian quarters in the town of Julfa, numerous convents and churches, and mansions that still retain traces of their pristine glory. Later on, the advent of Europeans, principally English, and the development of the East India Company in India, combined with the introduction in England of machinery for weaving purposes and the lavish extravagance of the Julfa Armenian merchants, gradually degraded the latter into a state of comparative indigence, and the bulk of the Persian and Armenian weavers were reduced to penury by being thrown out of their customary occupation. Persia, then, by heavy exports of her gold and silver in return for consumable commodities, became impoverished, but owing to the revival of some of her ancient industries, Southern Persia, at any rate, has fairly begun to recover herself, and the value of landed property in general both in Ispahan and Fars has been quadrupled.

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The Manager of the Devala Gold Mining Co., writing under date the 9th February, says :—" We have cleaned up after crushing 70 tons from the 300 ft. level. This, as I told you in a previous report, was not a prospect, but a lot of quartz and mullock lying at the mouth of the tunnel, which I did not at first consider payable stuff. After testing it, however, I saw it was not so poor as I had thought, and as it lay in our way I put it through the mill, and the 70 tons yielded 12 ozs. or very nearly 3 dwts. 9 grs. per ton. The lot I am putting through now is from the 140 ft. level, and from the appearance of the plates it should give a better result than we have ever had before. The old tunnel has been driven 7 ft. 140 ft. level, 8 ft. ; 200 ft. level, 4 ft. ; 200 ft. cross-drive 8 ft. ; 300 ft. level, 6 ft. ; 300 ft. cross-drive 14 ft. ; 400 ft. level 100 ft. The 200 and 300 ft. cross drives have broken through into levels above them. The drives were necessary to secure ventilation. and they were useful also as prospecting drives. At Harewood Reef there is no change to report. The cross cut has been driven 4 ft. more. February 16.—Yesterday we cleaned up 75 tons from the 140ft. level. The quartz was taken from a rise we are putting up to connect this level with the 200ft. level about it, and it has yielded a trifle over 18 oz., or nearly 5 dwts. per ton. The old tunnel has been driven 10ft. 140ft. level 7ft. ; rise up from same, 3ft. ; 200ft. level 5½ft. ; 300ft. level, 6ft. ; 400ft. level, 13ft. We are putting in another level to cut the reef 100ft. further along the line. At Harewood Reef the cross-drive has been driven 5ft. this week ; the stone is improving in appearance, and now contains small prospects of gold. The ground is still very hard."

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No observant person in Bangalore, accustomed to take his or her " walks abroad," can have failed to have become deeply impressed with the stern fact that we are on the eve of a water famine, with all its attendant horrors. The scarcity of water appears to be more felt in the native town than in the station, for in the former place, not only is water for washing, cultivation, and such purposes, quite unavailable, but drinking water is becoming more and more scarce every day, and people are driven to all sorts of expedients to procure a supply. All the tanks and *goontahs* are dry. There are just a few hundred gallons remaining in a corner of the Dhurmoody tank, which used to supply all the western half of the Pettah, and even that quantity must be exhausted in a day or two. The bed of the Sumpungee tank has, of course, been dry for the past four years, owing to its supply channels being directed to fill " Sankey's Folly " at Hebbal, but there has always been a sufficient supply in the *goontah* excavated in its bed at the western end during the famine. Passing the tank yesterday, we noticed that the *goontah* was as dry as an oven, and two or three attempts to sink wells in the *goontah* again, and thus obtain a small supply of water, proved abortive. The market gardens on the Pettah eastern suburbs are suffering greatly for want of water, and all over the place we saw people employed in sinking wells in the hope of getting water,—a hope which, in most cases, was not realised. The same attempts might be seen in other places,—anywhere where there seems just the ghost of a chance of getting a little water. If the windows of heaven are not thrown open within the next fortnight or so, we fear that a water-famine will inevitably ensue.

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The sericulture experiments, says a contemporary, which were commenced last year on a small scale in the Changa Manga Reserve, near Lahore, and proved so successful, are now to be tried on a much larger scale. The Forest Department have obtained a supply of imported Japan seed through Messrs. Lister and Co. of Bradford ; and a supply of home-reared seed from the Manager of Messrs. Lister and Co.'s firm at Dehra Doon. The advantages of rearing silkworms at Changa Manga are, that the new leaf is procurable early in the season, owing to forced irrigation ; the large supply of food for the worms ; the absence of hot winds in the forest ; and the fairly even temperature of Changa Manga. Two large sheds, 1,618 ft. in length and 20 ft. wide, have been put up. In these are two rows of shelves, 5 ft. wide, with two tiers in each ; so that when they are all occupied, there will be 32,360 square feet of worms devouring greedily all that is put near them. The worms began to make their appearance towards the end of February, and in March last there were an immense number of worms—a sight well worth a run down from Lahore to see. The worms are now spinning, and there is a fine collection of cocoons. During the Christmas week, Mr. Lemarchand was deputed to Dehra Doon to inspect Messrs. Lister and Co.'s rearing operations in the Eastern Doon ; and through the kind assistance of the gentleman in charge, he obtained a quantity of useful information, which will doubtless be applied to the proper purpose.

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According to an English contemporary, the report of the medical officer of health for the port of London shows that during 1884 the imports of frozen meat amounted to the enormous quantity of 619,324 sheep and 115,377 quarters of beef. Most of these supplies arrived in " magnificent condition," but in some instances great deterioration had taken place during the voyage, involving heavy loss to the importers. One ship, which arrived in August, had 2,279 quarters of beef destroyed out of a total freight of 2,289 quarters ; but this proportion seems to have been altogether exceptional. When meat is ordered to be destroyed, it is sold for boiling down purposes, the process being carried out under official supervision, to prevent any finding its way into the market. The price obtained generally leaves a small balance for the consignees after all expenses are paid, but this goes only a very small way towards covering the loss. On the whole, however, this important trade has now reached a reasonably safe condition, thanks to the knowledge, gained through repeated failures, of the best way of maintaining the requisite degree of temperature in the storage chambers on board ship. It is noticeable that while the imports from Russia and the United States show a tendency to fall off, those from Australia, New Zealand, and the River Plate are increasing prodigiously. During the first quarters of last year, only 99,537 carcases of sheep entered the port of London from these countries, but in the last quarter the number was 168,104.

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A circular has just been issued to the shareholders in the Colar Gold Mining Company, Limited, by the liquidators, which shows that, after all, the sale of the Company's property to the Indian Consolidated Gold Company is to be carried out, the limited opposition having been withdrawn. It is thought this result should be regarded with satisfaction by the shareholders in both the

Companies concerned, for it seems likely that the arrangement will be beneficial to both parties to it. The liquidators of the Colar Company will shortly send a cheque to their shareholders for their proportion or any cash balance that may be available for distribution.

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We learn that Dr. Rowell, principal medical officer in the Straits Settlements, has set an example which might well be followed to a greater extent than it has hitherto been in this country, although we are well aware of the good work done in a similar direction by Dr. Day and Dr. Shortt. We refer to the formation of a scientific collection of the fishes and crustacea inhabiting both the seas and the rivers of the Malayan peninsula. Dr. Rowell, we find, obtained the assistance of a taxidermist trained at the Madras Museum under Dr. Biddie, and with his assistance he has got together specimens of something like 100 different species, in which the natural colours of the fish are most wonderfully preserved. It is intended to place the present collection in the Raffles Museum at Singapore, but Dr. Rowell proposes also to send home duplicates of as many of his collection as possible to the Indian and Colonial Exhibition next year, where they may be expected to prove objects of attraction.

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A writer in an American contemporary says: "I discovered many years ago that wood could be made to last longer than iron in the ground, but thought the process so simple that it was not well to make a stir about it. Posts of any wood can be prepared for less than two cents a piece. This is the recipe: Take boiled linseed oil and stir in pulverised coal to the consistency of paint. Put a coat of this over the timber, and there is not a man that will live to see it rot."

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Mr. J. C. Douglas, of the Telegraph Department, author of a handbook of "Bee-keeping for India," writes to a contemporary: "I have to thank you for your article on my book. That Indian bees are very vicious if shot at, stoned, or irritated by much smoke is no doubt true, but with due care the large wild bees may be handled and kept under observation. Two German bee-keepers have handled them. A beginner in bee-keeping writes to me that he has just lost a stock he kept twelve days under observation, and I had a stock under observation which showed no signs of irritation, although I stood close to them, observed them minutely, and had large numbers of them flying round my head, and some striking against me. My first batch of Italian queens will be hatched in a day or two, and I should be glad to hear from any one willing to introduce Italians into his or her locality. This race is the one preferred in America; it yields most of the honey produced on the large bee-farms in Germany and America. All doubt as to Italian bees doing well in India is at an end. As a matter of fact they do very well indeed, but imported queens are very liable to be inferior, the journey being exceedingly injurious even to those which appear in good health on arrival. Of thirteen queens imported, seven were imported in full stocks, two in small stocks, and four in cages; only two survived and one of these has suffered in fecundity from the journey. Mr, Benton, a German dealer, offers to send stocks of bees to Bombay or Colombo for £5 a stock; the land journey has then to be performed, and the queens would not be improved by the journey, hence £5 a stock would be a low price for a good stock with a country-bred queen. I will send nuclei as far as practicable to persons willing to breed the bees; obviously breeding Italians would be better at present than simply keeping them for honey, although they are sure to get honey as soon as the bees are numerous. I will give the preference to naturalists and persons who have some practical knowledge of Indian or European bees. I charge nothing for the bees, but require the fullest instructions as to carriage, and that carriage and packing be paid. Bees cannot be sent in ordinary hives; they have to be packed in boxes costing Rs. 2 or 3 each, and the journey should be broken as often as practicable to let the bees fly. I have no doubt whatever that dealing in bees and honey will be found to pay in India, though at present I am most concerned to get the assistance of persons who would rather work to introduce bee-keeping than to make an immediate profit. I have many correspondents, and I beg that any one requiring information will enclose a stamped and addressed envelope, and not ask me to make enquiries as to cost of carriage, etc., which I have not time to make."

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The Horse-Show at Rajkote held in December last, does not appear to have been a success; and the Bombay Government have marked their sense of dissatisfaction in a Resolution published on the 16th March last, which runs as follows:—

Resolution.—His Excellency the Governor in Council notices with regret that the horse-show held at Rajkote in December last was not very successful as regards either the number or the quality of the animals exhibited. The total number, including foals at foot, was 206 against 402 in the previous year, and 280 in 1882. There was a large decrease in the number of mares and indigenous colts and fillies shown. The inferiority of the animals exhibited, with the exception of a few belonging to the Chiefs, was sufficiently indicated by the fact that none were considered fit to be selected for remounts.

2. In the class for geldings there were only 9 animals exhibited as compared with 13 in the previous year. This is not satisfactory. Every endeavour should be made to remove the prejudice against castration which is said to prevail amongst the Kathiawari breeders. There were not so many entries in the new class for ponies as could be desired. This is attributed to the apathy of the owners themselves rather than to the scarcity of good ponies in the province. As the judges are unanimously of opinion that mule breeding in the province should be encouraged, his Excellency the Governor in Council has no objection to the proposed restoration of the class for mares used for mule-breeding, which was ordered to be abolished in paragraph 4 of Government Resolution No. 923, dated 30th January 1884.

3. The Gondal State obtained first prizes in five different classes. In other classes also the first prize was awarded to animals which were the property of Chiefs.

4. The Superintendent, Horse-Breeding Operations, should be requested to submit any suggestions which he may have to make regarding alterations in the prospectus of the show or other matters connected with it. The information called for in paragraph 2 of Government Resolution No. 4392, dated 29th May 1834, regarding the working of the new stud arrangements made by the Chiefs has not been furnished. The Political Agents should be requested to submit a separate report on the subject through the Superintendent, Horse-Breeding Operations.

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As a rule official reports are anything but interesting documents. To the average reader the little nugget that lies at the bottom is hidden away from view by a *debris* of figures, and he hardly finds it a remunerative toil to remove the encumbrance. There are, however, exceptions to the rule, and we are glad to say that the report of Captain B. A. N. Parrott, Settlement Officer, Hanthawaddy and Pegu districts, is a lucid, instructive picture of the condition of the people over whom he rules. It is short and terse, and what is more to the purpose, there is scarcely a line in it which may be said to be superfluous. Captain Parrott says that the soil and character of the cultivation vary widely in different parts of this large tract, which contains sterile hills, rich forest, unculturable savannah and swamps, as well as rice-lands and garden-lands of varying richness, and considerable stretches of culturable waste. The Settlement Officer reports that in the middle of the tract the soils are "poor in appearance," having "been worked for many years." The population of the tract is 114,456 souls, or 104 to a square mile of gross area; it falls at 286 to the square mile of cultivation. The people are said to be less civilised than in the tracts further south and west; they are fairly well off, and have money to spare for pleasures and luxuries. The area of fallow is large, and cultivation throughout the tract is for the most part poor of its kind; but that is partly attributable to the small ratio borne by the population to the cultivated area. As the Settlement Officer points out (paragraph 124), the yield per acre usually varies inversely with the size of average holdings, that is to say, cultivators can till a small holding better than they can a large one. Out of a small number of cases (369 in all) in which inquiries were made, 46 per cent of the cultivators were found not to be in debt, 16 per cent had been in debt for more than a year, and 36 per cent had been in debt for one year. The average amount owed by each debtor of one year's standing was Rs. 108, but the average amount owed by the older debtors was heavy, namely, Rs. 579 each. Much of the debt was attributed to loss of cattle. Boat-owners, handicraftsmen, bazaar-sellers, and other non-agriculturists are said to be well off. The selling price of paddy-land last year ranged from Rs. 3-8-0 to Rs. 10-8-0 per acre, but the Settlement Officer considers that land in Pegu can hardly be said to have as yet a market value. The average area of a cultivator's holding ranges in the several tracts from 13 to 50 acres.

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THE number of tenants holding rice-land under landholders is 2,989, and they till 53,802 acres, or 21 per cent of the total cultivated area. Nearly one-half of these sub-tenants were found to be "paying revenue only," that is, the landholders allowed them to cultivate without claiming any rent. In the *majority of cases where rent was demanded the Burman custom prevailed, whereby the sub-tenant pays the revenue and* cesses, and pays also as rent to the landholder 10 per cent on the gross outturn of the sub-tenancy. The average payment made by sub-tenants of this class came to Rs. 3⅜ per acre of rice land as compared with the existing revenue rate of Rs. 1⅞ per acre. The rent paid by tenants on waste-land grants under the old rules appears to range considerably below the customary rent paid by the sub-tenants of petty landholders The Settlement Officer gives few particulars about the status and condition of sub-tenants. But in a district like Pegu, where holdings are large and sub-tenants occupy more than one-fifth of the cultivated land, the condition of this class will require watching. Separate reports have shown that, while there is plenty of land available in the neighbourhood, sub-tenants are fairly well off and can attain the status of independent cultivators after a few years' industry as field-labourers and sub-tenants.

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DURING the past 14 years the cultivated area of the tract under settlement has increased from 101,979 acres to 256,059 acres, or by 151 per cent, while the land revenue has in the same period increased from Rs. 1,76,357 to Rs. 4,58,796, or 160 per cent. The present area of cultivation, as above stated, is the area ascertained by the cadastral survey, and is 19½ per cent above the cultivated area as stated by the thugyis before the regular survey. The last detailed revision of the assessment rates took place in 1861, about which time the prevailing price of paddy was from Rs. 30 to Rs. 50 per hundred baskets. In the year 1879 the revenue was increased summarily by 25 per cent all round. In 1882-83 there was a sort of strike in some circles against payment of the revenue ; but in 1884 the land revenue was collected punctually, and the number of processes issued was smaller than in any year since 1879.

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THE Settlement Officer found five distinct classes of soils, some of which, however, were confined to small sections of the settlement field. He divided the whole area into eight assessment tracts according to the then relative facilities for the disposal of produce. All exportable paddy is carried by cart to the nearest navigable stream, and thence goes by boat to Rangoon. In future years a gradually increasing proportion of paddy from part of the assessment tract will go to Rangoon by the newly-opened Sittang Valley Railway. With an average rate of Rs. 70 per hundred baskets in Rangoon, the Settlement Officer estimates the local value of paddy to range from Rs. 30 per hundred baskets in the most remote tract to Rs. 65 in the tract nearest Rangoon. The present crop-cutting experiments on 165 plots in the different tracts showed the average yield to vary from 27 to 43 baskets of paddy per acre, and the total average to be 36 1/6 baskets per acre. Old records show that the test crop-cuttings of 1861 gave an average yield of 29½ baskets per acre in circles where the Settlement Officer's crop-cuttings of 1884 gave an average of of 20 baskets per acre. The average outturn, as stated by the cultivators for some of the circles, where fallow is most abundant and cultivation is slovenly, falls as low as 21 baskets per acre. The average yield assumed for the several classes of soil ranges from 25 to 40 baskets per acre ; and these assumed rates have for the most part agreed fairly well with the outturn rates actually admitted by the people.

On these data and on these assumptions the Settlement Officer has deduced revenue rates which represent one-half of the net surplus per acre after deducting all costs of cultivation and production. These rates, which range from eight annas to Rs. 3½ per acre, the Settlement Officer proposes for sanction as *maximum* rates. But he does not recommend that these rates be now enforced. He proposes that the rates actually to be imposed for rice-land should be 25 per cent lower, and should range from four annas to Rs. 2¼ per acre, with a special Rs. 3 rate for lands in Pegu town. The reasons for advising these lower rates are detailed in paragraph 140 of Captain Parrott's report. For garden and miscellaneous cultivation the Settlement Officer proposes rates ranging from Rs. 3 to 1-4-0 per acre, but he advises a special low rate of Re. 1 per acre for tobacco and sugar in order to encourage the production of these crops. He proposes also a special rate of Rs. 25 per acre for brick-fields, on the ground that land used for brick-making is destroyed for other uses hereafter. He advises a single rate of Rs. 3 per acre for all dhani-cultivation.

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MR. A. B. FFORDE, of the Settlement Department, has addressed a valuable letter, on "Irrigation Works," to the *Times of India* ; and as we agree generally in the views expressed by Mr. Fforde, we reproduce the letter below :—

I have read with interest your leading article on irrigation. The ryot is, as you say, in the habit of declaring that canal irrigation is not so fertilising as well irrigation. He says that the canal water is too "cold," requires more manure than that from wells. He does not say this of canals, from small streams, made by himself, but only of Government canals. The reason for his objection lies, I think, in the fact which I have often noticed, that he uses too much water when he takes it from Government canals, and water-logs his soil. Where the small village canals are used, he is restricted to a very limited supply of water, and gets no more than is absolutely necessary. His neighbours watch carefully to see that he takes no more than his proper share. Where the supply is practically unrestrained, as in the case of large Government canals, he keeps the water going all day and drowns out his crops. Again, since he can get much more land under water, he is tempted to spread his available manure over a large area, and compared with land under wells the crop is poorer in consequence. In the Deccan the ryot will often leave his well unused if he can get water from a local canal, because the labour is so much less. I imagine that, all expenses considered, canal irrigation, even if showing a poorer out-turn, is cheaper than that from wells—gives a larger profit.

As to deterioration of soil by canal water, that applies equally to wells. I have seen soil, formerly of the best, so ruined by well-water as to be perfectly barren. In the famine year I saw crops killed by water from wells. The smaller quantity of water probably caused concentration of the salts in the water-bearing stratum. If canal water caused the salts to rise from the lower strata where they generally lie, so does well-water, and in such strata the latter is even worse, because the water is drawn direct from the underlying strata and is not surface water like that from canals.

Where canal irrigation is impracticable, well construction would be of great value Seven years ago I advocated, in one of the Bombay papers, the construction of wells by private capitalists in such districts. There is no doubt that wells could be constructed and hired to the ryots at rates which would pay very largely indeed. Such wells would be a most valuable property.

The comparative failure of Government canals to return large profits is, I think, due to the fact that many of them are not perennial. The people will not pay high rates for water, unless they can get it during the summer months, and some large canals are, as I know, unable to give water all the year round.

That the people are willing to use canal water is beyond doubt. In one taluka alone in the Deccan there are upwards of 800 small canals from rocky streams. None of these can carry down anything but sand or stones on to the soil, but they are used wherever there is the slightest chance of making them. Well-water may be more fertilising, but very slightly so. It would naturally contain more earthy and vegetable matter from infiltration.

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A FEW months back the President of the Municipality of Madras requested the Local Government to modify one of the conditions under which it is proposed to make over the swamp known as Quibble Island to the Municipality for reclamation. Paragraph 3 of the order stipulates that "the lands should not be used for sewage farms or for the deposit of sweepings." The only material at the disposal of the Municipality for filling up hollows is street sweepings, and for the last twenty or thirty years this has been successfully used in reclaiming and raising numerous swamps and hollows in Madras. The reclamation is effected by digging pits or trenches into which the rubbish is shot, and it is then carefully covered with the earth or sand dug out of the pits. Portions of the Napier Park and of the People's Park were thus raised. The long stretch of land lying north of the railway line just outside, *i.e.*, to the west of the Central Station is the most recent case of land raised by sweepings and irrigated by sewage. It has proved a distinct sanitary improvement to the neighbourhood, and indeed were it not so, the Agent of the Railway Company would no longer assent to the present arrangement. I do not see any likelihood of any sewage irrigation at St. Thome for many years to come, and then only in connection with a regular scheme for draining that suburb. But if the Municipality are to reclaim Quibble Island, it can only be by slow degrees and by means of street sweepings and rubbish. If the Government consider some precaution necessary, I would suggest that Government, on the report of their Sanitary Commissioner, should retain power to interfere and to require the deposit of rubbish, or irrigation by sewage, if any, to take place under such restrictions as they may think proper, or to stop it temporarily or permanently if they consider it desirable on sanitary grounds to do so. The following order was passed by the Government on the 24th March :—The proposals of the President of the Madras Municipality are accepted, subject to the condition named, and on the further understanding that the nuisance arising from the use of sweepings in filling in the swamp and sewage irrigation while the process is going on will be mitigated as much as possible by carefully covering the sweepings.

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Tea fermentation is again exciting attention in Ceylon. The subject has already been exhaustively treated of before, but we take the following from the *Ceylon Observer* as illustrating the line of argument now adopted :—The subject is of increasing interest to Ceylon planters, but it is one which has engaged the attention and provoked the discussion of Indian planters for a very long time without any very definite result. A long controversy was started some years ago in our contemporary, the *Indian Tea Gazette*, on the subject of "fermentation," as to whether it was a correct term to apply to the process of discoloration which the leaf undergoes after rolling and before firing. Practical planters all then—and, we believe, now—agreed that the term was a misnomer, though this was combatted by more than one chemist of ability, Mr. Chas. E. Russel, M.R.A.C., amongst others. The latter gentleman saw no reason to doubt the propriety of the term, inasmuch as the primary process necessary to the fermentation of all fermentable matter do undoubtedly take place in the leaf of tea after rolling, "though they are checked before the true fermentation has been effected." It was thereupon pointed out by Mr. Chas. H. Lepper, an Indian planter of experience, that Mr. Russell himself by the above assertion had practically admitted that *true fermentation* never existed in the leaf before firing, which checked whatever process was taking place in it. Our correspondent "S." asserts, and quotes the *Indian Planters' Gazette* as upholding his theory, that, given a high temperature, dry leaf, and dry atmosphere, anyone can make good tea. But is this the experience of most tea-makers here? Is a dry atmosphere actually an incentive to rapid fermentation? Was it not found about this time last year, when the drought up-country was even more prolonged and pronounced than it has been this year, and the air was peculiarly free from moisture, that great difficulty was experienced in getting the leaf to ferment properly? Heat, of course, assists chemical action, but a dry atmosphere is also an aid to the process commonly called "fermentation"? We are inclined to doubt it. The theory that real fermentation never takes place in the leaf is further borne out by the fact that under suitable conditions, which cannot be difficult to determine, the roll is quite sufficiently "fermented" in three minutes or so, whereas, conditions being adverse, as much as half an hour may be required. Is it possible that fermentation—using the word in its strictest sense—can set in in so short a time as a few minutes? The leaf undoubtedly commences to decay from the moment it is plucked. "Withering" is but the first step of this decay. By the process of rolling, the sap expressed from the leaf is brought in contact both with the *cellulose* forming the skeletons of the leaf-fibres and the oxygen of the air, but whether the effect of this is to cause fermentation proper to set up a violent chemical action which effects the tanning of the leaf, softening the liquor as a result, we must leave a chemist to decide. But it seems to us that the chemical change which takes place cannot properly be called fermentation, inasmuch as the process is stopped by firing when the *cellulose* has been turned into *glucose*, and before the latter is converted into alcohol and carbonic acid gas. We should be glad if some correspondents with chemical experience would give us the benefit of their views on this subject.

SILOS IN SOUTH AUSTRALIA.

The importance of ensilage as a fodder is daily becoming more and more apparent. Wherever experiments in ensilage have been tried, they have resulted in a verdict in its favour over all other kinds of fodder. There cannot be the least doubt that in India ensilage bids fair to become a very important industry indeed, and as attention is now largely directed, not only by Government, but by private individuals, to the construction of silos all over India, we think any additional information on the subject cannot fail to be of interest to all concerned in ensilage experiments. The subject has attracted a great deal of attention in Australia, and its importance may be gathered from what Mr. J. L. Thompson, writing in one of the home papers, says that the wonderful results (recorded in almost every agricultural journal of the world) obtained by feeding stock with ensilage, must have brought the question home to every interested Australian—"Shall I construct a silo?" A very few years ago there was not a single silo in Great Britain, but at the present time there are 610, having a total capacity of 1,861,744 cubic feet, and representing about 34,000 tons of ensilage. Of these, England has 514, Scotland 60, and Wales 36. The largest silo is in the county of Argyll, and measures 60ft. long, 60ft. wide, and 16ft. deep, and has a total capacity of 57,600 cubic feet.

The same question must have occurred to many others, for we find that ensilage experiments are also being extensively made in Ireland, and the States of America have been, for some years, foremost in recording the results of the silo. It is somewhat remarkable that eminent scientific men have not taken a leading part in the matter of ensilage. On the contrary, they have thrown cold water on the subject, and not many months ago Professor Brown, of the Ontario Agricultural College, Canada, warned the British farmers not to be led away with the new-born ensilage.

Even the late lamented Dr. Voelcker, who so long filled the position of chemist to the Royal Agricultural Society of England, at first took a somewhat decided stand against ensilage. He afterwards, however, made many experiments, and came round to the opinion that the process of fermentation, or whatever it may be termed, gives considerable additional nutritive value.

Silos were first introduced into South Australia some years ago by a Mr. Charles Rake, of Olive Farm, Enfield, and two years ago a Mr. John Bell, a large supplier of milk to the city of Adelaide, constructed a silo which was opened for the first time at Christmas, 1883. Mr. Bell says that before he commenced using ensilage, his cows were drying up so much that he could not procure nearly enough milk to supply his customers. But ten days afterwards, although no addition in the number of cows, he could not dispose of all his milk, so great was the increase, and the quality also much improved. He was convinced that nothing could equal ensilage for milch cows.

The proprietors of the Beefacres estate, South Australia, being thoroughly convinced that the use of the silo would assist them considerably in keeping the stock in a progressive condition, and in supplying succulent food during the parched summer months, decided to construct a silo, consisting of four compartments, each 20 feet long, 12 feet wide, and 15 feet deep, having a total capacity of 14,400 cubic feet, and capable of storing 300 tons of ensilage. The walls consisted of lime and gravel concrete, and were plastered over inside with cement. There were two feet of dry pebbles below the walls, and from this an outlet to a low level, where any liquid that may accumulate could be run off; while Special attention was drawn to the moveable doorways, which were found to be very convenient in more respects than one. In removing the ensilage, instead of having to haul the stuff up 15 feet, by removing the moveable planks it saved a haulage of 5 feet.

But those who are unable to have a substantial construction, need not be debarred from giving the silo a trial on a cheap scale. A hole simply dug in the clay and covered over with loose sheets of corrugated iron filled with ensilage has been found to preserve just as well as in the silo of more architectural pretensions.

One of the proprietors of this estate gives the following as the mode adopted in filling their silo: We commenced filling the silo with a mixture of Cape barley, rye, and vetches. The reaper and binder commenced cutting early in the morning. Buncle's large travelling chaffcutter was put in position so that the stuff was elevated over the wall and fell right into the pit. The motive power was supplied from a portable steam-engine. The paddock was close handy to the silo, but it required three farm waggons to keep the machine going. With good steady work we managed to fill one pit in two days, and immediately on completion all hands turned to and put the planking and weights on as quickly as possible. The weighting used was good-sized boulders from the bed of the River Torrens: these were put on 2ft. thick all over the surface, this being equal to a weight of 2cwt. to the square foot, which is considered the proper weight by those who have had experience in the matter. When everything was fairly started, the work went on like clockwork, as the saying is, and on the afternoon of the eighth day the whole of the four pits were filled and weighted down. I should mention that a heavy Clydesdale was put into each pit (as soon as possible after a start was made), and kept moving round and round until nearly full. During the first few nights the shrinkage was very considerable, but after the first week no perceptible fall was observed, and on an average the stuff had gone down about 3ft. I am of opinion that fermentation goes on for about a month, and before the end of that time the ensilage would not prove palatable for stock. It is much improved by being kept three or six months, and at the end of 12 months, it has been found to be in first-class condition. Owing to a heavy crop of maize maturing for the silo, we were compelled to commence our ensilage much earlier than we otherwise would have done. We opened our first pit, which had only been put down a little over a month, and found the ensilage thoroughly preserved, having a slightly acid and vinous smell, which is not by any means unpleasant. When it is exposed for some time, it has the smell of apples. After all, however, the impulses of the cattle who are offered it are the best tests of its quality, and after a little snuffing round the trough, all ours commenced to eat it greedily.

This points to the necessity of not opening silos too soon. If the above-mentioned silo had been allowed to stand over for 12, or even 6 months, the acid vinous smell would have been absent.

In support of the argument in favour of ensilage, it is stated that cattle assimilate it batter than any other food, the reason being that the change effected in the silo is akin very nearly to that which takes place in the first stomach of ruminant animals. One fact was patent, that cattle have been found to take to ensilage readily, and thrive wonderfully on it. Its effect on milch cows in Australia is said to be marvellous. In one instance, it was found that some cows, which had been in milk for 8 or 9 months and were beginning to dry up, when supplied with ensilage, 'commenced to give a quantity almost equal to a new-calfed cow.' This may be slightly exaggerated, but it has been ascertained beyond doubt that ensilage is peculiarly suited to milch-cows.

Mr. Thompson furnishes the following very useful and practical hints for the construction of silos as adopted in Australia:—

The Construction of the Silo.—Local circumstances must determine what material can be most economically used for the construction. When plenty of good river gravel can be procured handy, nothing in my opinion can excel concrete of this material, being most substantial, and procurable at a trifling cost. It is not necessary to use cement in the construction of the walls; one part of good lime to four parts of gravel will make a good wall, but to give a better surface to the inside of the walls, it is well to plaster these over with one part of cement to two parts of clean river sand

The Beefacres silo division walls are 2 ft. thick; this is necessary to prevent lateral pressure from the division of the silo that may be filled first. The outside walls need not be so thick, as being built close to the clay bank lateral pressure can have little effect on them. Indeed I am of opinion that there is very slight lateral pressure, the cut fodder, being of a green, sticky nature, has not the tendency to burst out, as would be the case with wheat or water, for instance.

The Best Crops to put in the Silo.—I am strongly of opinion that anything of a succulent, green nature can be thoroughly preserved in the silo, and rubbish, such as cock-spurs, variegated thistles, wild oats, &c., that stock would not care to eat (unless very hungry), can be much improved in the silo, and when presented to the cattle, will be devoured with much relish. We tried an experiment with part of one of our silos as above, and were astonished at the result. If once a silo is erected, nothing on the farm can grow that cannot be put to profit and good account. As general crops, however, for the silo, nothing in my opinion can equal rye, vetches, and barley mixed for the first filling, and maize for the second. By liberal manuring and good cultivation, two heavy crops of the above can be procured in one year from the same land. Early in April, after the first rains, we sowed our barley and vetches, &c. This magnificent crop was fit for the silos about the middle of August; but as our silo was not then ready for its reception we had to fall back on a later sowing, and, as before stated, filled our silo early in November. I have said, however, that we had a magnificent crop of vetches, rye, and barley ready for the silo about the middle of August. The land can be immediately cleared of this crop, as there would be no time lost in waiting for the drying of the crop, and the land could be got ready in time for the planting of our maize in September, and this crop can be successfully grown even in a very dry climate. During the growth of our maize, from September 13, 1884, to January 7, 1885, only 4·672in. of rain fell, and, notwithstanding this small quantity, the crop all over was fully five feet high, and would average about 15 tons per acre. If water was available for irrigation, 30 to 50 tons of green maize could be easily grown.

The Advantages of the Silo.—Anyone seeing a magnificent crop of green, succulent vetches, &c., in the spring of the year would have, doubtless, expressed a wish that it could be maintained throughout the year. Now this is exactly what the silo will do. So soon as a crop of green fodder has come to its best, put it away in the silo, and it will not only maintain its good qualities, but actually improve, and in the many arid districts of Australasia during the hot summer months, when there is not a green blade to be seen, every farmer can have abundance of nutritious food at a trifling cost. Especially to owners of shorthorn herds, whose stock are sometimes retarded in their growth during the summer months for the want of good succulent food, would I recommend the use of the silo. Expensive artificial feeding has often to be resorted to which could be wholly dispensed with by its use. No system of preserving fodder can equal it; there is no waste, no shrinkage, and the mass comes out as it went in. One acre of land, if properly utilised, will give ample food for a milch cow for 12 months by growing two crops, as before mentioned, and the animal being kept under what is known as the soiling system, the whole of the manure could be returned to the land annually.

Miscellaneous Items.

DURING the month of February 435,012 cwts of wheat, valued at Rs. 18,53,492, were shipped from ports in Sind.

THE Indian Paper Mills Co., Ld., is busy erecting the factory at Kurruckwasla, and hopes are entertained that the mills will be in working order, in three or four months' time.

THE liquor trade of Rangoon seems to be making immense strides, if we may judge from the fact that all the godowns of the Custom House are full of liquor, and nothing but liquor.

ELEVEN and half tons of compressed hay were despatched by train lately, to Madras, for consumption by the horses of the Field Battery of Artillery ordered to proceed on field service to Quetta.

MANGOES will be exceedingly dear this season, writes a Goa correspondent, for very few trees have flowered, and in those which have, the blossoms have not all set, having been destroyed by dew.

THE Government of Madras have sanctioned an estimate, amounting to Rs. 2,07,000, for restoring the Red Hills tank of the Madras water-supply and irrigation extension project, including establishment and tools and plant charges.

THE Chief Commissioner of British Burmah distributed the other day medals and prizes to Burmese artists at the Art Industrial workshops in Godwin-road. The exhibits in this previncial art competition now being held at the workshops are well worth viewing.

A GOVERNMENT Resolution has been published, excluding the Crown Preserved Coal Company. of Cardiff, from all tenders for the supply of coal to Government, in consequence of a gratification of £50 having been offered by the Company to Major E. Marryat, Manager of the Punjab Northern State Railway.

IT will be sad news for those who have a partiality for mangoes to know that the crop this year will be unusually small. It is supposed that the shoots thrown out by the trees at this time of the year have had to do with the failure of the crop. It is, however, gratifying to know that with a small crop of mangoes, there will be a large crop of health, which an over-indulgence in this fruit never failed to impair.

FROM the report of the Horse Show held at Rajkot in December last (for a copy of which we are beholden to the Under-Secretary to Government), it appears that the show was somewhat disappointing, both as to the number and the quality of the exhibits. With a few exceptions, the animals are reported to have been "very inferior." The Political Agent, Kattywar, makes a suggestion for the future, which Government have adopted. They ask for future suggestions, too, which, we hope, will be made in time for next year. Though comparatively unsatisfactory, the Horse Show last year was by no means a failure.

THE Manager, Devala Moyar Gold, reported on February 23: "Salomon's Reef: We are carting quartz to the mill taken from the rise up between the 200 and 300ft. levels. This crushing will consist of 120 to 150 tons, and it will, I think, turn out fairly. The old tunnel has been driven 80 ft.; 140 ft. level, 16 ft.; rise up from same. 3 ft.; 200 ft. level, 7 ft.; 300 ft. level, 3 ft.; 300 ft. level, 2 ft.; 500 ft. level, 23 ft. The 400 and 500 feet levels are directed to drive upon what appears to be the eastern leg of the reef. The former contains payable quartz and a well defined reef; the latter has only just been commenced, and has not touched the reef as yet. —Harewood Reef: The drive south along the course of the reef has been extented 3 ft., but there is no other change to report."

A POONA paper says: "Madras has tried our East Indian Colony with success. Bengal has such an institution in hand, and as the Government is reported to be in favour of the movement, it will at an early date be undertaken and carried out. But, what of Bombay? Is it to remain altogether in the background? What is the European and Anglo-Indian society doing? As Bangalore was found just suited for such a colony in the Madras presidency, and Darjeeling in that of Bengal, so Poona, for the Bombay presidency, offers facilities which no other station can. There are several farms, at the present time, owned and worked by East Indians, and with excellent results, after years of trial. The establishing of such a colony here would prove a boon and a blessing to the Government, no less than to the community at large. Such a colony will be hailed as a great blessing."

CAPTAIN B. D. PLUMMER reported on February 24: Mining Operations; The lode in the north end and at the bottom of the mine appears to be getting smaller. This we might have expected as the run of ore ground dips north, and we have been working close upon the north point of the ore. The south end, at the bottom of the mine, looks very fine, and the rock is somewhat easier to cut. The lode in the bottom of shaft, as far as we have taken down, look very healthy and strong;—173 South End on the West Lode: There is still a width of 2 ft. of quartz by the side of the old workings. How far it will hold, it is impossible to say; it appears to be made up of branches left by the old men. The last essay value, which was made on the 29th instant, was 2 ozs. 16 dwts. 8 grs. per ton of quartz. The winze in the bottom of this level has cut through the arch, and now it is in "attle" or deads that the former workers had packed in to keep the sides open.

A CORRESPONDENT at Yercaud, Shevaroy Hills, writes to say: "A very peculiar noise, the cause of which is as yet undivined, was heard on various parts of these hills this morning about 8 A.M. It sounded somewhat like distant thunder, but the sky was quite cloudless at the time; the noise lasted for about 40 seconds or more, and died away gradually. An earthquake was the first thought that suggested itself, but no tremor of the earth was felt; it seemed to come from an easterly or north-easterly direction. The noise was too prolonged for an explosion of an ordinary nature, and died away too gradually, though somewhat sudden in its commencement. It would be interesting to know if it was heard in other parts of the country. I was five miles from Yercaud when I heard it, and on return here I found it had been distinctly noticed here also, and an earthquake was expected, but as to its origin, we are all puzzled."

THE Straits Settlements Emigration Act, No. V. of 1877, having been repealed, and emigration to that colony being now regulated by the Straits Ordinance, No. 5 of 1884 ("The Indian Immigration Ordinance, 1884"), his Excellency the Governor in Council proceeds to lay down rules for the guidance of officers who will be concerned in carrying out and superintending such emigration. The District Magistrate of Tanjore, the Port Officer of Negapatam, and the British Consular Agent at Karikal, will be appointed to be Emigration Agents for the purpose of these rules. The District Magistrate will submit to Government the name, or names, of such officer, or officers, as he may recommend to be appointed Registering officers for the purposes of these rules, and these officers will then be so appointed and invested with powers under the Native Passengers' Ships Act. The officers concerned are requested to carefully watch the working of these rules, and report at the end of the year whether they are found to be suited to the objects in view, or in what respects they need to be modified.

AT the end of the official year 1883-84 there were 21 jute mills at work throughout India, giving daily employment to 47,868 persons, of whom 26,494 were men, 10,331 women, 6,348 young persons, and 4,695 children. All but two of the mills are in Bengal, most of them near Calcutta, one of the others being in Bombay, and the other at Vizagapatam. Both of these, however, are very small concerns. The two first mills were established in 1864; between that date and 1872 three more were started; from 1873 to 1875, seven more were established; six came into working between 1876 and 1880, and three more have been started since 1882, so that the industry may be said to have grown up entirely within the last twenty years. The mills at present at work contain 6,139 looms, 112,650 spindles, and worked up, during the year, about 142,000 tons of jute. But these figures cannot be entirely relied upon. The same may be said with regard to the nominal capital of the mills, although those that are worked by Joint Stock Companies return their capital at 20 lakhs. No return of capital is made by eight out of the 21 mills, as they are worked by private firms. It is estimated that about 65 or 70 lakhs may be taken as the capital of these private mills, which would give a total capital of about 270 lakhs invested in the jute industry.

Selections.

THE PREPARATION OF COCA.

READ—the following letter from M. A. LAWSON, Esq, Director of Government Cinchona Plantations, Parks and Gardens, Nilgiris, to the Secretary to Government, Madras, Revenue Department, dated Ootacamund, 18th March 1885, No. 522:—

WITH regard to the questions relating to the preparation for commercial purposes of the leaves of *Erythroxylon coca*, continued in G.O., dated 17th February 1885, No. 207 Revenue, I have the honor to forward, for your information, an extract on the subject taken from Bentley and Trimen's Medicinal Plants, volume I, 40:—

"Much care is taken in the gathering, drying, and preservation of coca, as its activity and value depend in a great measure on its mode of preparation. Some differences in detail occur in the collection and preparation of coca in different districts, but, as a general, rule the processes are as follows:—The leaves are gathered as soon as they have arrived at maturity, at which period they are bright green on their upper surface and yellowish green on their under surface, and have an agreeable and somewhat aromatic odour. The leaves are gathered separately and carefully by the hand, with the two-fold object of preventing them being crushed or bruised in the process; and also so as not to injure the young leaf-buds which are left behind, for the purpose of obtaining a second crop of leaves. They are then carried away in baskets and spread out on paved surfaces or on the floors in the courts of the houses, or sometimes on woollen cloths, and dried slowly in the sun. This operation requires great care, for if the leaves be dried too rapidly, they lose their odour and green color, and, if stored away before they are thoroughly dried, their color is also changed, and they acquire a disagreeable odour and taste. In some districts the leaves are occasionally trampled over while they are damp, under the impression, it is said, that they thus acquire a delicate flavour and smell, but also probably to preserve their flatness in the drying process. After being dried, the leaves are either stored in barns or huts, or packed in bags or bales, in which they are pressed by treading, and are thus transported to a distance. These bags or bales (*costos*) appear to differ very much in size, their weight being variously given by authors at from 24 to 150 lb. As the properties of coca are injured by transportation, and often by keeping, it would probably be best preserved in cases or packages lined with tin, or at least in well-closed pots to protect it from air and moisture. The produce of coca per acre in a good harvest is estimated by Weddall at about 900 lb., and in some districts there are three or even four harvests in the year. The total produce of coca is probably not less than 40,000,000 lb., which, estimating the value on an average at the low price of one shilling per pound (for the best qualities yield at least five shillings) in the countries in which it is produced, would represent a total value of £2,000,000, so that coca is by no means an unimportant article of commerce, and its production is, moreover, described as being very remunerative. It is chiefly exported from Lima."

2. From the above extract it will be seen that the chief points to be attended to are—

1*st.*—The rapid drying in thin layers of such leaves as are fully developed and are yet not too old.

2*nd.*—The immediate packing of the dried leaves in air-tight boxes.

3. Those who possess and desire to harvest leaves for sale in England should experiment on small quantities in different ways until they arrive at a satisfactory result, and to this end I would recommend them to proceed as follows :—

(1) Pick the leaves early in the morning.

(2) Spread the leaves out on some smooth surface, such as boards, so that there should be—

(*a*) One layer of leaves.
(*b*) Two layers of leaves.
(*c*) Three layers or thereabouts of leaves.

(3) Select a place for drying the leaves which is exposed to the sun, and if the leaves curl up or turn brown, try different degrees of shading.

(4) Pack the leaves tightly as soon as dried in layers in tin or other air-tight boxes.

4. Mr. Hooper experimented upon a sample of leaves from plants grown at Burliyar; from these he extracted a 2 per cent. crude alkaloid. Some of this was given to Dr. Bidie, who handed it over to Dr. Brockman for trial, and Dr. Brockman has pronounced the compound to be worthless. From this, however, nothing more necessarily follows than that the leaves were improperly selected or improperly dried, or that the necessary chemical processes in extracting the alkaloid were not observed.

5. Mr. Hooper will be shortly engaged upon fresh experiments, and, when these are completed, they shall be communicated to you.

UTILISATION OF PEAT SWAMPS IN INDIA.

IT is not a little surprising that the numerous peat bogs which form so distinctive a feature of the Nilgiri plateau and other Hill ranges in India, are left in undisturbed possession of the snipe and moor-fowl, and that no attempt is made to win from their turfy depths the wealth which only needs the enterprise and mechanical ingenuity of the energetic European to realize it. The mechanical preparation of raw-peat for use as fuel is a branch of industry which has been brought to a high state of perfection in Australia, America, Scotland, and other European countries, and there is no reason why it should not prove a success in India. The importance that attaches to the development of this source of industrial wealth may be estimated by the extent of waste bog, now useless, that would at once obtain a high value were the raw-peat, which the swamps yield abundantly, manufactured into that valuable product, peat-coal. From various measurements made, it is found that the average depth of bog on the Nilgiri is 9 feet, and this depth would give 11,250 tons of raw-peat to the acre; and allowing 6 tons of raw-peat to yield one ton of peat-coal, the produce of peat-coal per acre would be 1,875 tons. It is true that an isolated experimental attempt, made some years ago, not only to manufacture good cheap fuel, but also to utilize other products of peat, resulted in failure; but this ought not to paralyse further action, because failure resulted from defects not necessarily connected with the enterprise itself, but rather with the means employed to carry it out. Similarly, the first attempt at the mechanical preparation of peat-coal in Australia was not attended with success, on account of the imperfect and costly means employed in its manufacture.

Bog-peat is decayed vegetable matter in a state of transition towards coal by the natural operation of time. It exists in various stages of decomposition, according to locality and age. Peat prepared in the ordinary way for fuel is of two kinds. One is cut and spread out on the bog surface, in the first instance, to dry; then collected, and set up endways in small heaps preparatory to being carted home, and stacked for use. The second kind is much superior, though more expensive to make, than the "cut-turf" It is made out of the black peat taken from the bottom of the bog, worked up into the consistency of thick mud, then spread out on the bog surface, to the depth of six inches or so, and shaped off into bricks for drying. This turf, when properly made, and effectually dried, is very hard, and in quality superior to any preparation in the ordinary way. But even the best turf, when air dried, under favorable circumstances, seldom contains less than 20 per cent of water, and this detracts proportionally from its value as a heat producer, because so much of its caloric is wasted in evaporating the large precentage of water it contains. Now the solitary attempt to which we have alluded to manufacture peat for fuel, &c., on the Nilgiris, was attempted by means of mechanical compression, and the same mistake was made during the inauguration of the industry in Australia. To this end ingenious machines were designed in the latter country, and it was from no want of inventive genius or mechanical skill that the principle of compression failed in practice. Admirable appliances for the purpose were designed to squeeze the water out of the peat, thereby rendering it dense and solid, so as to be more easily dried—and more valuable when dried—because it would contain thus prepared a greater amount of heat-producing material in a smaller bulk. But the process was found not only faulty in principle, but also hopelessly expensive. Ordinary peat when cut in the bog may be taken to contain 90 per cent of water, so that a machine would have to squeeze some five or six tons of raw peat to produce one ton of comparatively waterless compressed peat. Thus a great expenditure of mechanical force is involved, and this force cannot be brought into action without a corresponding expenditure of water or steam as a motive power. Moreover it was found, after much spirited enterprise, that even with the employment of enormous pressure, perfectly solid and waterless peat-coal could not be obtained by compression and subsequent air drying.

It was discovered that the most economical and perfect way by which raw-peat could be manufactured into peat-coal was as follows: The black bog stuff, which is thoroughly decomposed peat, and consists of very minute particles, is puddled well together with a due admixture of water, and passed through a very fine sieve. This is submitted to the process of drying, and the particles possess an adhesive affinity, the effect of which is to combine them together in one solid mass, analogous in density and hardness to ordinary coal. In this way a substance is obtained far superior in delicacy of grain and hardness to the latter. The peat particles thus treated, become fossilised, as it were, so much so indeed as to equal the petrified organic matter known as jet. This jet like peat-coal is susceptible of being worked as jet. It will take a very high polish; can be turned into a table, and converted into various articles of beauty and utility such as vases, cups, &c. The surface peat of a bog can also be treated in the above manner by macerating the raw-peat in water, and allowing the pulpy mass to drain by subsidence, when the particles by a natural cohesive affinity unite and solidify.

As regards the commercial value of peat-coal, it has been proved a most efficient and economical substitute for ordinary pit-coal, and in many respects is much superior to the latter. It is extensively used in working locomotives on Australian and American Railways. The cost of manufacturing peat-coal for the Grand Trunk Railway of Canada, where wages rule high, is under 5 shillings per ton, while it possesses a heating power equal to good pit-coal in the proportion of five to four. One ton and a quarter of peat-coal is equal to one ton of the best English pit-coal for ordinary steam boilers, &c., but for household purposes and for furnaces having little drought, and with the firebars close together, one ton of peat-coal is equal to the same quantity of the best Newcastle coal. The additional advantages of peat-coal are that it can be used for all purposes for which pit-coal is used, while it does not emit any smoke, contains no sulphur or phosphorus, gives a bright clear fire, and causes no injury to boilers, flues, &c. For iron works, manufactories and railways, it is specially valuable. The smoke nuisance, which is a great evil in itself, is avoided by its use, while its cleanliness and high caloric power renders it peculiarly valuable for domestic use. In Australia it is calculated that when pit-coal is 20 shillings per ton the proportionate value of peat-coal is 16 shillings, and its cost of production about 6 shillings per ton. It thus yields a return on the capital employed of 200 per cent. This profit is not speculative but warranted by practical experience. With the cheaper labour of India a greater profit could be realized.

Peat-charcoal is another product of the bogs much more valuable than peat-coal and much more costly to manufacture. But if we consider that in its manufacture other important products of the peat are obtained, such as tar, sulphate of ammonia, oil, paraffin and methylated spirits, the production of peat-charcoal is comparatively costless. As this charcoal, like the peat-coal, does not contain any sulphur or phosphorus, it is invaluable for the manufacture of steel, bronze, copper and all metallic substances—particularly for cutlery—gun-making, electro-plating, and also for the manufacture of porcelain and China-ware, and for all purposes where wood charcoal is used. The facts leave no room for doubt concerning the highly remunerative character of the manufacture of peat-coal, &c.; while no question can arise respecting its vast importance as a source of industrial yet undeveloped wealth. Indeed, when we consider that the peat on the Nilgiris and other hill ranges of India is practically inexhaustible, its utilisation on a sound, scientific, and remunerative basis becomes a matter of national interest.—*Madras Mail.*

THE MAINTENANCE OF DAIRY STOCK.

(By Professor Sheldon.)

There has been a good deal of discussion in recent years respecting the extension of dairy farming in tillage districts, and the term 'arable dairying' has been adopted to distinguish the so-called new departure or development in dairy husbandry. It is probable that the topic received a considerable share of its impetus from the articles on Continental dairying which, appearing in the *Journal* of the Royal Agricultural Society and elsewhere, were written by Mr. H. M. Jenkins, the talented and indefatigable secretary of that Society; yet the low price of grain for many years past, together with the depression which has ruled so long in sheep farming, both of them intensified by the wet seasons which have passed over us, and these, in contrast with the comparatively profitable character of milk-selling and stock-raising, have had still more to do in attracting arable farmers' attention to this particular aspect of dairy farming. It is no doubt true that this extension has been going on to some extent, accompanied by the laying down to permanent pasture of a good deal of arable land suitable to the purpose, but there is not much probability of the extension being continued to any very striking extent.

Permanent grass land is, as every one knows, a leading feature in the dairy farming of the British Islands, though more or less of arable land is usually found associated with it. Our humid and irregular climate accounts for the prevalence of grass land, and particularly for its extension in recent years; and in view of this climatic disability, together with the fact that dairy farming may easily be extended too far, and, indeed, has already been extended too far, to yield a profit very much superior to that of other branches of husbandry, it is to be feared that the laying down of arable land to permanent grass will go on still in places in order to lessen expenses. It does not at present seem so much desirable that dairy farming should invade purely arable districts farther than it has done already, as that arable cultivation should be restored and developed in dairying districts. Notwithstanding the costliness of arable cultivation, a proportion of arable land is, generally speaking, an element of profit and convenience to dairy farmers, and cannot very well be dispensed with, save in highly-favoured localities. In some parts of France, as also to a less extent in one or two other continental countries, permanent grass land is almost entirely dispensed with by many dairy farmers; but a practice such as this is the growth of many years, and cannot in one generation be successfully engrafted on a different system of agriculture. The chief obstacle, perhaps, lies in the farmers themselves, rather than in the land they occupy and the climate under which they live.

It remains to be seen whether the practice of ensilage will become general and permanent on dairy farms in these islands. For my own part, I hardly think it will; and whether, if it does, it will materially affect the current proportion of grass and arable land. We may decline to accept the enthusiastic claims which some persons advance in favour of ensilage, as well as their predictions that it will revolutionise the practice of dairying, and we may incline to the opinion that, so far as the maintenance of dairy stock in winter is concerned, the most it will do will be to take the place of roots and brewers' grains; but, whatever we do, it is clear that it has taken a great hold on the imagination of the farming public, and that it is being experimented with in earnest in most parts of the country. Forage, that is ensilaged instead of desiccated, cannot reasonably be supposed to be better than it was in its green and natural state, and we may dismiss the idea that almost any kind of coarse and inferior stuff, such as the grassy undergrowth of trees, and various kinds of green crops that are not palatable or nutritious in their growing state, are greatly enhanced in value by being confined in a silo for a few months, yet is there one substantial advantage which well-preserved ensilage possesses over the hay, for instance, that might otherwise have been made from the grass, *viz.*, it remains in a succulent and easily digestible condition. It is on this ground, indeed, that ensilage will become popular and general, if it does so at all.

We may take it for granted that permanent grass land, used as pasture, will in our time continue to be the chief source of the maintenance of dairy stock, except in the winter months, and it is not at all likely that the French practice of 'soiling'—that is, of cutting grass and other green crops for consumption in yards and sheds and byres—will become very general in this country in the remaining months of the year. Rather than this, the American practice of soiling on the pastures with adjoining cultivated green crops, which is an old though limited practice here at home, is likely to become extended in connection with arable dairying, on land that lends itself with advantage to the cultivation of such green crops. It would seem probable that the growth of vetches, cabbage, clover, and so on, for the purpose of soiling on the pastures in spring and summer and autumn, might in many localities be profitably extended with the view of supplementing the pastures; and a properly adjusted proportion of arable land, used for this purpose of soiling, would enable a large number of cattle to be maintained on a given farm. The object to be aimed at is the production of a maximum quantity of food for stock, in a manner which leaves a substantial profit; and, in order to do this, a well-balanced proportion of arable land, harmonising with a staff of men and horses, would seem to fit in well with the etymology of the term 'arable dairying.'

It is winter, however, rather than summer, the provision for which taxes the ingenuity of dairy farmers, for that is the period in which the maintenance of dairy stock is felt to be a burden both in cost and labour. It is winter, indeed, which lends the chief importance to arable dairying, because of roots and straw, and ensilage, too, if you will. To winter a herd of cattle on hay alone is a practice ill calculated to be profitable, and this aspect of the case is well understood in districts poorly adapted to arable cultivation. On a wholly grass farm there is not work enough for the hands who are required to milk the cows, and it is only on a farm that is partly arable that the labour bill can be properly filled between times, so to speak, in all the seasons of the year. In some localities it is feasible to hire women for milking only, at a reasonable rate, and in these cases, a smaller staff of men can be kept on farms whose area of arable land is too limited to keep a full staff in work. This labour question makes itself seriously felt in these days, and it has a distinct and immediate bearing on the employer's profits. Hence it follows that farmers in many cases have been tempted to lay down land to permanent grass, with the object of cutting down the labour list, which, it is obvious, can only be done within limits. This it is, too, that has induced so many grass-land farmers to give up dairying, and take to the fattening of stock in summer, in the hope of doing with a minimum of labour and of wear and tear of implements.

The wintering of a herd of dairy cows, and of its necessary relay of young stock, is felt to be a serious matter, and it appears all the more serious when the cows are mostly dry for calving. This unpleasant feature of the case, together with the opening supplied in recent years by the milk trade, has led to a considerable extension of 'winter dairying'—that is, the production of milk in winter. But this has found its limit during the winter out of which we are just emerging, and milk has been cheaper, and more plentiful than ever before, at that season of the year. The cost of producing a full supply of milk in the winter months is best understood by those who go in for that sort of thing, and it may be said that a great deal of last winter's milk was produced and sold at a loss. This will cause a reaction against winter dairying to some extent, but dairy stock have to be maintained all the same. The entire thing has to be kept well in hand by the master, and economy of feeding must be introduced wherever it is possible, for we live in times when close cutting is the order. Store stock, milk, cheese, butter—all of them are at low values, and likely to be for some time to come; and in this event the efficient and economical maintenance of dairy stock is a matter of greater importance than it was ten or a dozen years ago, when the profits were good enough to support any reasonable system.—*North British Agriculturist.*

PREVENTION OF DISTEMPER.

I have lost two young collies lately from distemper, and have another, six months old, which I should not like to lose. Can I do anything to prevent the attack or to lessen the force? The puppy has freedom to run about all day, has a good dry bed at night. His food consists principally of porridge and milk, with an occasional bone or other scrap.—J. C. B.

[The better-bred dogs are most liable to distemper, and suffer from it most seriously. Amongst young collies it often does deadly damage, and many which survive the attack continue long, or even permanently, the subjects of chorea fits or partial paralysis. Like other febrile disorders of young animals, distemper is notably contagious, and it probably does not, like colds, coughs, gastric derangements, or other such disorders, arise spontaneously or from insanitary conditions. Prevention is hence secured by protecting dogs from contact with sick or convalescent subjects. Dogs, however, are prone to roam freely on their own account, and it is accordingly difficult to isolate infected animals, and those that have been in contact with them, and thus prevent distribution of contagious germs. With the view to protect from attacks and diminish their severity, young dogs have been inoculated with vaccine lymph; but vaccination has not answered the expectations formed of it as a preventive of distemper. Investigation may yet discover, as in the case of anthrax diseases, that a modified form of the disease may be produced by cultivated lymph, and that young dogs inoculated with it may resist the ordinary unregenerate distemper. Like the contagious eruptive fevers of children, and especially measles, to which it is closely allied, it seldom occurs more than once in any individual. Besides protecting from contagion, preventive treatment is limited to maintaining young dogs in good general health, and when the disease prevails in a neighbourhood, giving the puppies in their porridge, soup, or other food, twice or thrice a week, 4 to 5 grains of hyposulphite of soda, which, being almost tasteless, is readily taken, and from its antiseptic properties lessens the severity of febrile disorders, and sometimes even protects from their attacks. In kennels, and other places where distemper has occurred, the contagious germs are apt to remain with unimpaired activity for a long time, and hence it is very essential that wherever infected subjects have been kept, repeated thorough disinfection should be adopted.—Vet. Ed.]

INDIAN SILK.

TO THE EDITOR OF THE "PIONEER."

SIR,—Your article on the Bengal silk trade is before me, and I think that the writer is rather severe on Bengal silk in particular, and casually so on Punjab silk, and he also seems rather hazy as to what reeled or raw silk and thrown silk is. I have the pleasure to send you by sample post a small skein of raw silk from my miniature filature (from Berthand's Lyon), and beg to inform you that it was produced here under my own supervision from cocoons reared in my own sheds. Cocoons of equal quality are produced by careful rearers in this and the neighbouring district of Goordaspore; the mulberry of every kind grows up here to perfection; silk reelers are to be got who will do good work at a moderate wage, and I have been engaged, with the help of the district authorities, Colonel G. Gordon Young and Colonel C. V. Jenkins, in encouraging the industry of sericulture for over two years. Hitherto it has thriven wonderfully well with me, and the above-mentioned gentlemen will be very sorry to read your decrying article without some contradiction possibly, or partial fight, for the pretension of the north of the Punjab to produce good "bone" silk. Perhaps if the writer of the said article took the trouble to glance at the map of the world, he would find that the north of the Punjab and the part of China and Japan where the best and strongest silk is produced, lie just above the 30th paral. of N. Latitude. Perhaps also, this is the reason why I have found the Japan silk-worms thrive so well with me, that the reports from several centres in England, Italy, and France are that the cocoons cannot be excelled in the world, and probably also the reason why I obtained a Silver Medal and 1st Class Certificate at the Calcutta International Exhibition for a very small case of cocoons, when a gentleman and silk expert, who tested them and the silk reeled from them, reported them second to none in the world. My silk sent to you may have many faults, as I have been reeling less than six weeks and with last year's cocoons; but I am open to learn if you can give me any information regarding it, and I shall be obliged, therefore, if you will kindly test it, and let me know whether or not it is a good "bone" silk. I myself believe that this part of the world will produce the best silk, and with capital I could produce a quantity that would command a very good export price; and I should be glad to hear of any one with capital who would join me in increasing my outturn. It already pays me to produce it and reel it at the present low price of silk, which, on account of the Franco-Chinese war, is the lowest ever known. The reason why the silk industry is not flourishing in the Punjab is not because the climate will not grow good silk, but because the native is so lazy and trusts so much to his gods to give him a good crop of cocoons that the worms die of hunger and dirt, and disease, the companion of the latter—and they will not plant mulberry near their own doors. It ought also to be pretty well known by this time that the rearing of the silkworm to produce good cocoons is a matter of considerable difficulty, unless patience and perseverance, to say nothing of a certain amount of intelligence and cleanliness are exercised, and that the consequence is that good silk being difficult to produce, a good price is always obtainable for it where good silk is used and wanted, and there is always a demand for good silk. The fashion now-a-days is to try and get things cheap and vile, viz., plush instead of velvet, &c., &c. Cheap things can be spun from pushum or waste silk, from waste cocoons and from wild silk, very few of which can be reeled so as to pay, on account of the difficulty of softening them, and of their open ends, and also of the difficulty of collecting them in sufficient quantity.

Spinners in Europe are making fortunes out of waste, it is true, and are always crying out for these wild silks which are known to be used by natives in certain districts; and they imagine they will be able to encourage old *Bombyx Mori* out of the field. This they will never do. Nothing has yet been able to hold its own against the *Bombyx Mori*, either in silkworms or other textures, and I believe that though wild silks may be used to a small extent, a good Japan cocoon can be produced in the Punjab, and as good silk from it, as any in the world and as cheap, always remembering that a good article in silk is always dear for reasons that are well known, and which have lasted for hundreds of years in spite of every endeavour to the contrary.

ERNEST R. BARTLETT.

Palumpore, Punjab, 3rd April 1885.

WATER THE COWS.

THE following data, though not sufficiently exact to be called scientific, are of some practical value in enabling farmers to judge of the effect of watering cows regularly and often, and in not doing so. Since January 1, we have been milking an average of about 24 cows. The majority of these cows calved in March and April, 1884 We therefore expect a shrinkage, as previous months show, of about 30 pounds per day. Suppose the average for December had been 370 pounds per day, we would expect the average for January to be 340 pounds per day. During 16 days in January we obtained 5,426 pounds, or an average of 339 pounds per day. From the 10th to the 13th inclusive, the average was 320 pounds per day. During this time the cows were watered in the morning and at noon, when turned out, but not at night. After this they were watered three times a day, and on the 15th we obtained 343 pounds; 16th, 340 pounds; 17th, 347 pounds. We aim to feed regularly and give each cow the same quantity. I judge during the time that the hay was of the same quality. I should say that the care and attention given was the same during this time. The cows were milked clean and regularly. The hay and other feed was of about the same quality the entire time. The temperature of the weather as recorded by J. N. Barr, in Independence, was as follows:

DATE.	Temp. 7 A.M.	Temp. 7 P.M.
January 10	10	30
January 11	27	26
January 12	10*	16
January 13	26*	8*
January 14	2	4
January 15	0	0
January 16	4*	4*
January 17	16*	13*

* Indicates below zero.

The probable conclusion, therefore, is that the better system of watering the cows three times a day added to the quantity of their milk. Prof. Sanborn says: "What cows will naturally drink per day by one watering, will be exceeded by two waterings by about 10 to 12 per cent, and is followed by a slight increase of milk without loss of butter product as shown by the churn. When the water desired by the cows was cut down about 40 per cent (too much for a good test) the milk flow declined heavily, and also the amount of food eaten as well as a consequent loss of weight of the body."

It is said that the agricultural college at St. Remy made experiments to determine the effect of warming water to 66 degrees F. before giving it to the cows, and found in the case of two cows given the same amount of food an increase of one-third by warming. There is no question but what there would be an increase, but it seems almost impossible to think that it could be 33 per cent. It is not to be assumed that warming the water would operate alike on all cows. It is not to be expected that a cow giving 40 pounds per day can be increased to 53 by this system. A cow giving 12 or 16 might be increased to 16 or 21 pounds per day, possibly. Any close observer has noticed that cows will drink more when the water has not been chilled by exposure, than they will when it is very cold.—J. N. MUNCEY.—*Farmer's Review.*

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

THE disease commences with a slight derangement of the stomach, but, if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions he will be able to determine whether he himself is one of the afflicted:—Have I distress, pain, or difficulty in breathing after eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does a thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste? Is the tongue coated? Are there pains in the sides and back? Is there a fullness about the right side as if the liver were enlarging? If there costiveness? Is there vertigo or dizziness when rising suddenly from a horizontal position? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach? Is there frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one of long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantity of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market-Place, Pocklington, York, Oct. 2, 1882.

Sir,—Being a sufferer for years with dyspepsia in all its worst forms, and after spending pounds in medicines, I was at last persuaded to try Mother Seigel's Curative Syrup, and am thankful to say have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same complaint to give it a trial; the results they would soon find out for themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. TURNER.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating

Registered No. 182.]

THE
INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA:—SATURDAY, MAY 2, 1885. [No. 18.

Crop and Weather Report.

[FOR THE WEEK ENDING THE 22ND APRIL 1885.]

General Remarks.—Slight rain has fallen in several districts in the Bombay Presidency and generally throughout the Punjab. In Bengal, the Central Provinces, and in the Central India and Rajpootana States, slight local showers have occurred. In Assam heavy rain continues to fall.

Prospects remain unchanged in Madras, and the harvest yield is reported to be below the average in some districts. In Mysore prospects continue unfavourable.

In Bombay and the North-Western Provinces and Oudh the *rabi* or spring harvest is approaching completion, and preparations for the *kharif* or autumn crop have begun in places. The *rabi* harvest is in active progress in the Punjab, and has been nearly completed in the Central Provinces, where threshing and winnowing are going on. In the Berars the *rabi* crops have been reaped, and preparations for the *kharif* are progressing. In the Central India and Rajpootana States, agricultural prospects are generally good.

Rain is much wanted in Bengal to facilitate agricultural operations. Sowings continue in Assam, and prospects are on the whole favourable.

Cholera and small-pox are generally prevalent.

Prices are fluctuating in the Punjab, and show a tendency to rise in Bengal. In other Provinces they remain generally stationary.

Madras.—Prospects fair, except in parts of Bellary and Anantapore.

Bombay.—Slight rain in parts of sixteen districts. Standing crops injured by floods in parts of Shikarpore; sugarcane slightly improved by rain in parts of Belgaum; preparations for *kharif* crops in progress in parts of Dharwar, Satara, and Khandesh. Scarcity of drinking-water in parts of seven talukas of Dharwar, four of Belgaum, and two of Bijapore, and of fodder in parts of three talukas of Dharwar and four of Belgaum. Cholera and small-pox in parts of eleven and fever and cattle-disease in parts of nine districts.

Bengal.—Weather very hot; slight rain fell in some districts, chiefly in the Dacca and Chittagong divisions: rain is urgently wanted. Agricultural operations are retarded for want of it in some places, though sowings of early paddy and some *bhadoi* crops are going on; *boro* pady and *dalua* are being harvested. Prices of food-grains show a slight tendency to rise. Public health on the whole good.

N.-W. Provinces and Oudh.—Harvesting nearly completed. Market well supplied, and prices generally steady. Cholera continues in Agra; new cases reported from Saharunpore and Aligurh, otherwise public health fair.

Punjab.—Rain in all the districts of the province, except Hissar, Delhi, and Umballa. Health good; a few cases of cholera have occurred amongst pilgrims from Hurdwar and Delhi. Outturn of crops in Lahore district poor, elsewhere prospects are on the whole good. Price fluctuating

Central Provinces.—Weather continues uncertain, with occasional storms. Prospects are unchanged.

British Burmah.—Slight small-pox and cholera here and there, otherwise public health good; health of cattle good. Slight rainfall in some districts.

Assam.—Weather hot with occasional wind. Sowing of *aus* crop nearly finished; prospects good. Ploughing and sowing of *dumahi* and *murali* crops progressing. Public health fair.

Mysore and Coorg.—Paddy crop in good condition. Rain much needed for coffee plants. Prospects of season and public health good.

Berar and Hyderabad.—Weather cloudy and close, with occasional thunder and duststorms. Threshing almost completed; preparations for *kharif* progressing. General health fair, except in Shahabad taluka, where fever and ague prevail.

Central India States.—Weather clear and pleasant, though warm. *Rabi* and opium good. Health good.

Rajpootana.—Weather changeable. No further cases of cholera reported. Prices steady. Health good.

Nepal.—Weather hot and dry. Prospects indifferent, owing to want of rain.

Letters to the Editor.

SEEDLINGS FROM GRAFTS.

TO THE EDITOR.

SIR,—Allow me to make a few remarks upon a theory, which appeared in your issue of 4th April 1885, p. 159. It was there stated that "it is a well-known circumstance in the practice of grafting and budding, that, if seedlings are raised from grafted plants, they invariably turn out of a degenerate species; and the fruit they yield is of the same quality (if not worse) than the parent stock, upon which the better species was grafted."

This is a horticultural theory, which, although it is said to be derived from the *practice* of grafting and budding, and to be *invariable*, is, in my opinion, certainly not in accordance with facts. Does it imply that, each of the 400 or 500 varieties of apple (many of them very choice), which are now grown in England, came only from seeds of apple-trees which were grown on their *own roots?* That all the innumerable varieties of grapes, oranges, mangoes, &c., &c., now in existence, have originated from seed grown on plants with their own roots? That all the fine choice roses, now in cultivation, have been raised from seed, grown on their *own root* rose-bushes? It would appear that this is one of those theories which are hastily drawn from a very limited practice. It is certain that it does not apply to the orange, nor to the mango, and it is certain also that it is anything but invariable. According to this theory, none of the many *improved* grafted or budded plants could have taken any part in *producing* the innumerable varieties now under cultivation, as it is said, that seeds taken from a graft or bud *invariably* produce degenerate progeny. Let any one extend his practice to raising *tens of thousands* of seedlings, instead of a few dozen, and give high cultivation, with other favorable conditions, he will then I think find that this theory requires reconsideration. Some persons have a notion that if they sow a few seeds, anyhow, of any good fruit, they will get equally good fruit out of the seedlings. They are disappointed to find they are probably worse than the parent, and hastily conclude that the fault lies with the seed having been obtained from a graft! It is much like taking a ticket in a 1000 ticket lottery. You *may* get the prize, but the chances are 999 to one that you *won't.* Raise 10,000 seedlings of any grafted or budded fruit, and nurse them properly, and give them every chance of healthy and vigorous growth, and you will find that the resulting phenomena are roughly divisible into three classes, more especially if the seeds have had an opportunity of being *crossed.* (Darwinian biologists think that *no two can be exactly alike.*) *First*, the majority of the seedlings will turn out *inferior* to the fruit, from which the seed was taken, with many variations—not because they may have been seeds of *grafts*, but because they have inherited bad qualities from their *ancient wild* progenitors as civilized man does now inherit bad qualities from his remote ancestors, although his immediate parents may be every thing that is good. *Second*, a certain number of the seedlings will be *equal* to the parent fruit, more or less varied. *Third*, the minority will be better than the parent. One of the reasons why raisers of new choice varieties of fruit, or other trees, charge so highly for them when they first bring them out, is that they have to recoup themselves for all the years spent in nursing thousands of inferior plants, the labor and time bestowed on which, until they are *proved*, being *thrown away.* The worthless ones are then dug up, and used for firewood, or other purposes. Of course no nurseryman will undertake to raise new fruit unless he has great facilities for this work, as this business *does not pay*; moreover, few persons ever think that the flowers of their grafts can be so easily crossed by *insects* with the pollen of the *original wild kinds*, where these exist in the vicinity. Crossing even with the best blood will sometimes "throw back." What can be expected if bad blood be admitted ?

It is probably established that the stock sometimes influences the graft, and *vice versa*, but that seedlings raised from grafted plants invariably turn out of a degenerate species is unbelievable, and far from a "well-known circumstance in the practice of grafting and budding."

E. BONAVIA, M.D.

Etawah, April 26, 1885.

Editorial Notes.

In continuation of our review of Captain Parrott's report of the Hanthawaddy and Pegu Disttricts, we note that the first results of the settlement officer's proposals are as follows :

The average incidence of revenue on paddy land per acre, together with the total land revenue without cess, are—

	Incidence	Revenue.
At present or old reveuue rates...	... 1·60 Rs.	4,08,471
At proposed maximum rates —	... 1·96 ,,	5,03,004
At rates propesed for present application...	1·74 ,,	4,48,381

The net increase therefore under the rates proposed to be applied, would be Rs. 39,910 a year, or 9¾ per cent.

Captain Parrott's proposal has received the approval of the Commissioner, who, however, considers it improbable that the maximum rote will ever be applied during the term of the settlement. It is thought that the higher rate is likely to be much felt by the people in certain parts of the Meynizaya circle, where the prevalent rates have been 10 and 7½ annas.

⁂

The brick-field rate has been sanctioned at Rs. 10 instead of Rs. 25 the acre, as recommended by Captain Parrott ; but the rate on tobacco lands remains at Re. 1 the acre. This is as it should be, for the only way to encourage the cultivation and other miscellaneous crops, is by levying a very low rate of assessment.

⁂

The revenue from fruit trees has been fixed at a uniform rate of four annas the tree ; but it would only apply to fruit-bearing trees or trees standing on unoccupied land, or on land not paying revenue, or on land paying the fallow rate only, and trees belonging to one person, but standing on land held by a cultivator altogether separate from the tree owner.

⁂

The lower rates on paddy land proposed by Captain Parrott have received the sanction of the Chief Commissioner, and will be applied in all tracts except Meynizaya. The reasons given for not applying the maximum rates are, that they would cause too large an increase, coming as it would after the enhancement of 30 per cent imposed in 1879-80 ; and also because the price of export paddy is not now so high as it was during the last six years. The averages for those years were reckoned as not likely to fall below Rs. 70 per 100 baskets, while during the month of February 1885, Rangoon prices had gone down as low as Rs. 60 and 65, as compared with Rs. 86 at the same season in 1884.

⁂

There was stronger reason for not attempting the increase of rates, *viz.*, falling prices, cheap grain in Europe, and serious disasters among rice-exporting firms, owing to the high prices paid for paddy in 1883-84. And although against these draw-backs may be cited the close proximity of rice-growing districts to the good mart of Pegu, the traversing of one side of the circle by a canal, and another by the new railway to Toungoo, the great strides made in cultivation, and the cultivated area having been much under-measured by Thugyis, yet it was not considered wise to raise the demand at one stroke.

⁂

Under these circumstances, therefore, the revenue to be collected from 1st July 1885, has been fixed at Rs. 4,33,672, intead of Rs. 4,48,380, as proposed by Captain Parrott. This is an increase on the demand under the old rates, and a decrease of Rs. 14,708 on the settlement officer's proposal, the incidence being 6·17 per cent.

We have noticed the thoroughly practical and interesting nature of Captain Parrott's report, and it is gratifying to find that his work has been suitably acknowledged as a fitting tribute to his labours, by the Chief Commissioner of British Burmah. Although the season's work terminates this officer's connection with the settlement portion of the duties upon which he has been engaged for the past six years, yet his connection with the province he has helped to settle will continue in the capacity of a Deputy Commissioner of one of the districts. We entirely echo the encomiums passed upon Captain Parrott's labours, and repeat that the people, as well as the revenues of the province will, for many years to come, derive benefit from the excellent work done by him.

⁂

We have before us the result of the labours of Mr. E. C. Ozanne, who was appointed to the newly-created post of Director of Agriculture in the Bombay Presidency, which he joined in July 1883 after his return from furlough, which he would seem to have devoted more to duty than to recreation.

⁂

There is reason to believe that Mr. Ozanne spent the greater portion of his furlough in study at the Royal Agricultural College, Cirencester, to qualify him in a greater measure for the post he was intended to fill. When we take into consideration the scope of the operations contemplated by the new department, there can be little doubt that the knowledge which Mr. Ozanne brought after a sojourn in the Cirencester College was absolutely necessary to enable him to discharge efficiently the responsible duties required of him as Director of Agriculture ; and being armed as he is with diplomas not only of the Cirencester Institute, but of the Royal Agricultural Society of England, it will be admitted on all hands that he is duly qualified for his onerous appointment, and therefore entitled to speak with an unusual degree of authority on all matters affecting agriculture and kindred subjects. It is therefore with no small degree of interest that we proceed to review his report for 1883-84—being the first of its kind.

⁂

We find that Mr. Ozanne spent much of his time in visiting the various farms and agricultural schools scattered about India, with the object, we presume, of making himself acquainted with their working. It may be mentioned *en passant* that unless the Director of Agriculture, of any province whatever, spends some of his time in visiting mofussil institutions, making enquiries and supervising experiments on the spot, there can be very little hope of any practical results being obtained, and we are glad to find that Mr. Ozanne has seen the necessity of this.

⁂

The system of collection of revenue and rental in precarious tracts has, we find, not been taken up ; but under the head of 'measures of protection,' including fodder reserves and arboriculture, extension of communications and irrigation, Mr. Ozanne makes some practical observations on the uses of the pod of the *babul* (acacia arabica) for tanning purposes. It will be interesting to learn whether this product is likely in time to become an article of export. The subject of arboriculture is confined to the discussion of the value of the *rab* as a manure. We expected something more than that under this head.

⁂

It is disappointing to find that the authority of the Director should be so hampered by red-tapeism as to place agricultural farms under the orders of the Collector of a district. This is a division of authority which we do not approve. The sketch of operations on the several farms during the year, shows that at Bhadgaon, the work and result were decidedly unsatisfactory, for which reasons are given. The manufacture of cheese is an important element in this farm : and if the superintendent, who is bringing out fresh information on the subject from England, can apply his knowledge practically, satisfactory results may be looked for.

⁂

The working of the Hyderabad farm is more hopeful. The experiments with common pulse seeds were not, however, successful, while those with nankin cotton were. Steam ploughs have been found to be used successfully by the natives, who prefer them to ordinary ploughs. The financial results of the farm show a deficit of Rs. 783, which is exclusive of the pay of the Superintendent and clerical establishment. An experiment with ensilage proved a failure, as the excavation was made in land containing 53 per cent of sand.

⁂

The Botanical Gardens, Ghunneskhind, Poona, did some good work. It was found that burial destroys the reproductive power of prickly pear.

⁂

Mr. Ozanne states that it has been decided by Government that model farming will not be attempted, and that the action of Government will be confined to experiment; but undue stress will not be be laid on financial results. This is quite correct; as, if an experiment is undertaken with the financial results only in view, much cannot be expected. The experiments with cotton were not successful, although prizes were offered for each of the four cotton talukas of Dharwar. Nor did the introduction of jute afford encouraging results.

⁂

Under indigeneous experiments, tobacco was tried. Its cultivation was all that could be desired, but the curing was an utter failure, although every attempt was made to carry out this process successfully.

⁂

The question of ensilage has assumed much importance; for we learn from England that the Government have taken up the subject in right good earnest. Before the mail left London, it was arranged to appoint a Royal Commission for the purpose of conducting a thorough enquiry into the matter. The Commission was expected to commence its labours immediately after Easter.

⁂

It is satisfactory to note that among those who have consented to take part in the Commission, there are three Peers of the realm, six members of Parliament, and several leading agriculturists. There is thus much hope of satisfactory results being obtained from the enquiry, and we shall await with interest the publication of their report.

⁂

The last number to hand of the Journal of the Agri-Horticultural Society of India, Vol. VII., contains some interesting papers. We notice the following as deserving attention:—"Notes on Vanilla," by T. Langlois, Esq., is a practical guide for the cultivation and preparation of Vanilla for commercial purposes. Mr. Langlois has evidently had much experience with this plant.

The Report on silos in Mysore, contributed by Sir Herbert Macpherson, proves two facts, *viz.* (1) that the experiment in ensilage was a success, and (2) that small silos in greater number are preferable to a single large one. The latter point should be borne in mind by those who undertake the construction of silos.

The Report of the Committee, appointed by the Benga Government, as to the best fibre-cleaning machine, will be read with interest. We have already, in previous numbers, noticed this report, and only refer to it here incidentally.

Captain Frederick Pogson's paper on Indian wheat contains some useful hints. His suggestion for the introduction of maize of good quality in place of bajra, marwa, kuugnee, &c. is a good one, only it would be rather difficult to persuade ryots and zemindars to adopt the suggestion.

⁂

The death of Sir Lawrence Peel, one time President of the Society, forms the subject of a paper in this volume. It is a graceful tribute to the memory of an excellent President, and a large-hearted, generous man.

⁂

Captain Passon has floundered somewhat, we think, in his attempt to show that the existence of cattle salt—or more properly black salt—was unknown to the members of the Board of Revenue. In fact, he appears to be quite 'at sea' as to its composition and manufacture. Baboo Protab Chundra Ghose, the Vice-President of the Society, correctly describes the article, the name of which, Captain Passon says, was not fit to be uttered in the presence of "ears polite."

⁂

Mr. Cogswell's paper on the jute fibre-preparing machines, will be found of value by jute cultivators and manufacturers.

The treatment of "wither blight" on tea plants will be read with interest by our tea planters, it concerns them very deeply. The paper is a practical one, and needs no comment.

From Mons. Dumaine's paper it would appear that the lac insect (*Coccus Larca*) can be propagated *ad lib* by trans-plantation. As the lac industry is of some commercial importance, the hint is worth promulgating.

Mons. Dumaine's method of rearing the tusser silkworm will be read with much interest. It is only by such practical experiments that satisfactory results can be obtained.

⁂

There can be little doubt that the cultivation of the vine in Cashmere has made rapid progress, judging from Dewan Lakhpat Rai's paper on the subject. There are no less than 352,525 plants under cultivation. There are 18 varieties of the grape, of which 2 are used in manufacturing white wines, 6 in the manufacture of red wines, and 10 are table grapes. Two Frenchmen are employed upon this important industry—one to supervise the gardens, and the other in charge of the wine department. With vine cultivation on such a large scale, we ought to hear of Cashmere wines in the market!

⁂

The results of the experiments conducted by General Wilkinson in feeding milch crows on ensilage, are very important indeed. If any doubt existed before as to the superiority of ensilage over grass, they must inevitably be dispelled by these results. It would be almost too much for one's credulity—were the facts not vouched for—to be told that two cows when fed on ensilage for 28 days gave an increase of as many seers of milk, and two similarly fed on grass, decreased by 80 seers of milk in 28 days!

⁂

Water is now being purified at Philadelphia by mixing air with it under pressure. The pressure assists the absorption of oxygen by the water and its consequent purification. A Fairmount turbine has been transformed into an air-pump, which forces 20 per cent of free air into the water main, or, in other words, sufficient to surcharge the water. Analysis shows that the quantity of free oxygen in the ærated water is 17 per cent greater than before æration, while the quantity of carbonic acid is 53 per cent greater, and the total of dissolved gases 16 per cent greater. The percentage of free ammonia is diminished to one-fifth of its former amount. The results are held to show that æration is quite practicable as a successful means of reducing the percentage of organic impurities in water.

⁂

The return lately published of the areas under tea and coffee cultivation in India for the year 1883, disclose some interesting facts. A comparison between the figures in the year 1875-76, and those in the year under notice, shows that in the former year in Assam and Cachar, 87,307 acres yielded 20,028,890lbs. of tea, and in 1883, 18,4953 acres yielded 52,171,20, lbs. In Bengal 26,378 acres produced 4,941,226lbs., and in 1883, 49,753 acres produced 10,703,139 lbs., while in the North-West Provinces, 4,363 acres gave 631,182lbs. as against 7,819 acres giving 1,202,147 lbs. In the Punjab 4,246 acres produced 679,949lbs. against 7,964 acres yielding 1,300,010lbs. In Madras, 2,392 acres produced 220,070lbs. as compared with 5,423 acres yielding 529,490lbs.

⁂

Two small plantations in Burmah are mentioned—one of 150 acres at Akyab, and another of nine acres in Toghoo, but their produce is said to be very trifling. So that during the nine last years, the acreage under tea increased by nearly 109 per cent, and the whole outturn by nearly 149 per cent. By taking the separate districts, we find that in Assam there were 49,091 acres in Cachar, 40,532 in Sibsagar, 36,873 in Lukhimpore, 28,083 in Sylhet, 16,601 in Durrung, 10,786 in Nowgong and 6,220 in Kamroop. In Bengal of course, nearly three-fourths of the tea-producing areas are in the Darjeeling district, which had 33,817 acres, whilst Julpigoori had 9,220, Chittagong 2,909, Lohardugga 2,752, and Hazaribagh 1,023. In the North-West Provinces, there were 4,775 acres in the Doon, and 3,043 acres in Kumaon and Garhwal.

⁂

IN the Punjab there were 7,964 acres in Kangra, and only one small plantation elsewhere; while in Madras there were 4,772 acres in the Nilgiris, and 580 acres in Travancore. In regard to coffee, the whole area under mature plants in 1883 was 185,839 acres, and the entire yield about 30¾ million pounds; which is very much below the mark as compared with previous years, of which, however, the returns are said to be imperfect. Mysore has the largest area under coffee, amounting to 82,108 acres; Madras has 53,917 acres; Coorg has 41,600 acres; Travancore 6,268 acres; Cochin 1,938 acres, and Bengal only 8 acres.

⁂

A CONTEMPORARY says, in a recent article we wrote, "Salt shows a steady growth in spite of a serious falling off in the Madras Presidency. This last merits more explanation than is given to it; a decrease of ten lakhs of rupees in the revenue from salt in Madras is more worthy of explanation than the many general trade matters which have had pages of this statement devoted to them." An authority on the subject tells us that the reason of the decrease is very simple. For many years past it has been the practice in Madras to give wholesale purchasers of salt six months, credit on deposit of Government paper or other easily realisable safe security. Until quite recently no more than about 25 per cent. of the whole quantity of salt passed out of the works was removed under this system, but within the last two or three years there has been a great increase in these credit sales, and more than half of the salt is now cleared on these terms. The only reasons that are given for the development of the system are that it took the up-country dealers years to find out its advantages to them, and that of late the large dealers in Madras have established agencies at such important (salt) centres as Negapatam and Tuticorin. The result, we are told, is that the sum due to Government on account of these credit sales is now some ten lakhs more than it was a year or so ago, and on March 31, stood at about 37 lakhs against 27½ lakhs on March 31, 1884. There has, therefore, been a postponement of the collection of revenue, not a loss of revenue. It may be objected that Government loses interest on the money thus due to it. But if the money was paid in to-day it would not be used to pay off debt, but to raise the cash balances which earn no interest. But even if there is a loss of interest the officials think that the community gains more than Government loses by a system which stimulates and encourages the salt trade.

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THE *Mechanical World* notices a new substance, called *vulcanized fibre,* which is designed to replace india rubber and leather for mechanical purposes. It is said that among the new materials that have of late years been introduced for such purposes, none appear to have stood the most crucial test of time so well as the vulcanized fibre now under notice. Although, comparatively speaking, a new substance, there are two reasons which account for its great and increasing popularity, and these are its almost universal applicability to all mechanical requirements, and its lowness of cost. The fibre is prepared by treating vegetable fibre, previously reduced to a finely-divided state, with certain active and powerful chemical agents, by which process the properties of the vegetable fibre are entirely changed. From the fibre so treated, two kinds of the vulcanized fibre are made, these being the hard fibre, which is well adapted to replace the softer metals, and the flexible fibre, which greatly resembles leather in its pliability. In the course of its preparation from the vegetable fibre it is made into two forms, sheets and tubes or cylinders; and from these two all other shapes and forms are produced. It is generally prepared in three colors, *vis.*, a very bright grey, Indian red, and black, and the latter colored fibre so closely resembles ebony that it can only with difficulty be distinguished from it, while the Indian red has so much the appearance and color of leather, that sheets of fibre of this color will be readily mistaken for the best sole leather. It is said that the hard vulcanized fibre has a specific gravity of about 1·3, and possesses remarkable anti-friction properties which render it very serviceable for bearings or journals of machinery, and for slides, gibs, bushings, etc. It is said to be an excellent non-conductor, alike of heat or electricity and as it stands a very high degree of heat without injury, it is especially applicable, and is most extensively used for electrical insulation. It is described as being very tough and hard, and in its texture and general properties bears a strong resemblance to horn, with the exception of being homogeneous throughout, and having no stratification or cleavage.

⁂

It works well in the lathe; can be cut with a sharp, strong screw thread; takes a fine polish, and can be readily drilled, riveted, sawn or stamped A further advantage claimed for it being that it is not affected by oils of any description; and when used for small high-speed journals, it greatly outlasts brass or Babbitt metal, and requires only about one-half the usual lubrication. In its flexible form the fibre, it is said possesses all the foregoing advantages as regards toughness and strength, and only differs from the hard class in its pliability, which approaches that of rubber or leather, but unlike either of these, it is unaffected by oils, fat, heat, &c., and does not become soft and limp when exposed to their action. Further, that this class of the fibre is chiefly used for carriage axle washers, plumbers' washer's, gaskets for water packings, oil box covers, &c., and when it is stated that either class of the fibre is perfectly insoluable in hot or cold water, oil, naphtha, petroleum, or alcohol, and is but slightly affected by most of the acids, it will readily be seen to what a wide range of purposes this material could be applied. When used as a facing medium with that type of friction gearing, consisting of a wheel having a non-metallic face, bearing hard against a driven wheel with a metallic face, the fibre has always given unqualified satisfaction. With such advantages it will be readily understood what a valuable commodity this new substance is likely to prove In India especially, where India-rubber and leather lose their usefulness with very little hard work, the vulcanized fibre would be found of immense benefit, if the qualities attributed to it can be accepted as correct. It would, we think, be worth while trying a few experiments with it out here.

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THE report on the prospects of the wheat crop in the North-Western Provinces and Oudh for the month of March is as follows:—"Wheat area of the United Provinces for March is 5,284,404 acres, which is greater than the area reported for February by 18,085 acres, and greater than the normal area by 318,721 acres. Taking normal area at 100, the area now under wheat in the United Provinces is 106, area under white wheat is 1,213,980 acres, area under red wheat is 2,010, 239 acres, area under mixed red and white wheat is 2,060,185 acres. The month of March has been favourable with bright weather and westerly winds, and the prospects of the crops have decidedly improved. Taking 100 to represent full average, the condition of the crop is as follows:—56,264 acres stand at 100; 641,323 acres at 90; 2,803,881 acres at 84; 1,740,481 acres at 75; 42,454 acres at 66. The gross outturn of one full average crop on the area, as now ascertained, would be 2,500,000 tons. The present estimate of the season's crop is 2,040,000 tons, or 90,000 tons in excess of the February estimate. Taking 100 to denote the gross outturn of a full average crop, this season's crop stands according to the present estimate at 82."

A later report gives the following additional information:—"Estimated gross outturn of the three sorts of wheat in the United Provinces is as follows—white wheat 491,884 tons, red wheat 745,185 tons, mixed red and white wheat 804,460 tons. Estimated total stock of wheat in the United Provinces on 1st April 60,000 tons."

Miscellaneous Items.

18,881 bales of cotton, weighing 68,900 maunds, 33 seers, were imported into Kurrachee by rail during the month of March 1885.

IT is notified that the charge of the Inam department has been entrusted to the acting Director of Revenue Settlement and Agriculture.

THE estimate, amounting to Rs. 18,370, for completing the upper storey of the Agricultural College at Saidapet, has been sanctioned by Government.

EXTENSIVE and valuable phosphate deposits are said to exist in a singular natural cave in Alachua county, Florida. About 57 per cent of the rock is pure phosphate.

THE weather keeps very seasonable, i.e., hot winds blowing as if from a furnace, and a still hotter sun; the nights and mornings pleasant, and the public health very fair for the time of year.

THE net amount of Indian sea and land customs revenue, exclusive of the salt revenue, for the official year 1884 85, was Rs. 98,14,000 as compared with Rs. 1,13,98,000, in the previous year.

THE last *Calcutta Gazette* contains the lists of gentlemen who may be called upon to sit as Special or Common Jurors during 1885-86. In the first there are [illegible] names, and in the second 1,939 names.

THERE was a heavy fall of rain at Coonoor last week accompanied with hail. Several heavy showers have also fallen in Wynaad. On Friday last, about noon, two inches of rain was guaged at Pur[illegible]alore.

The Masters of the vessels now in port (Rangoon) are so greatly [illegible] regard to the desertion of their crews, that some of them have given the Police *carte blanche* to arrest any of their men [illegible] may be found ashore, and have promised to defray the costs of arrests.

A [illegible] barrel has been patented by Mr. George F. Knapp, of St. [illegible], Mo. This invention provides means whereby the centre of the barrel may be securely held, while either end is adopted [illegible] to examine the contents, and so the hoops may be locked securely or readily unlocked.

In consequence of the appointment of Mr. H. L. Wright to act as [illegible] of Customs during the absence of Mr. G. F. M. Grant, Mr. [illegible] acts as First Assistant, Mr. Jehangeer Maneckjee [illegible]setjee as Second Assistant, and Mr. W. Aimon as Third Assistant Collector.

A MARINE Court of Enquiry, which was recently convened at Akyab, to enquire into the circumstances connected with the loss, on the Oyster Reef, of the Italian barque *Trepudio* on the 9th of last month, has, we learn, found the master guilty of culpable neglect of ordinary precautions.

THOSE troubled with mosquitos will find a remedy which has been discovered in Sydney. It is asserted that if a tablespoonful of carbolic acid is put on a plate, and a piece of iron is heated and placed in the acid, dence white fumes will arise which will promptly drive all flies and mosquities out the room.

THE planters in the Kangra Valley are organizing an Infantry Volunteer Corps to be called the Kangra Rangers. Great enthusiasm prevails. The corps will practically be a body of Mounted Infantry, as each member will have to ride a long distance to parade, and will carry his carbine in cavalry fashion.

WE learn that the Munda market in the village of Ushtoo, Satara Collectorate, tumbled down on the evening of the 17th April, and that fifteen men were buried under the *débris*. Assistance being rendered and the bodies removed, it was found that two men were killed, while the thirteen others were more or less severely injured.

MR. T. MANICUM NAICKER, to whom the silver medal was awarded by the Madras Agri-Hoticultural Society last February for indigo, and Mr. T. Moonoosawmy Naicker, to whom the silver medal for tobacco was awarded, at the late show, having applied for cash in place of medals, their requests have been compiled with by the Society.

THE value of cattle lost by disease in the Madras Presidency during the year 1883-84 is estimated at Rs. 2,68,080. This figure is arrived at by taking Rs. 25 as the average value per head for sheep, cattle and buffalo, and Rs. 2-12 per head of goat, and deducting one-fifth from the total on account of young and under-sized animals. The two most destructive diseases were anthrax and rinderpest.

THE veterinary hospital in connection with the Madras Agricultural College at Saidapet is doing useful work. The Director of Agriculture reports that some of the students have turned out very good practical men. The cases admitted to the hospital for treatment, and the medicines supplied to the public, both show a large increase in 1884 over the previous year.

THE transfer of the Economic Museum to the Government of India is likely to be postponed till next year. Mr. Buck just now has his hands full of work in connection with the preparations for the Indian and Colonial Exhibition, to be held in London next year; and, besides, the time is not favourable to the Government of India undertaking any financial obligations that can be conveniently shelved for the present.

A SECTIONAL non-conductive covering for tubes has been patented by Mr. William M. Suhr, of New York city. It is formed of two semi-cylinders of plaster of Paris, asbestos, and sawdust, covered on the outside with a layer of felt, which in turn is covered by a layer of thick paper, the covering being formed in sections and delivered dry and hardened ready for application, so a large quantity of pipe can easily be covered in a short time.

AROWAH Factory, in Chupra, we are told by a contemporary, has again been the scene of an outrage on the person and property of Mr. MacGregor. Some nights ago he awoke by hearing a movement in his room, and was soon in hot pursuit of the thief, who, finding himself on the point of being captured, flung his *puggree* in Mr. Macgregor's face, and then hitting him on the head with a *lathee* got off, but dropped a watch and chain which he had secured in the bed-room.

A VERY important judgment as to the rights of landowners on the sea-shore was recently delivered in Penang by his Honor the Chief Justice in the suit of Mr. J. L. Wemyss, a machinist, iron founder and boiler maker, who rented land on the seashore under a lease from the owners, and claimed damages for loss of access to the sea through the Government reclamation of the shore outside of his premises. The Chief Justice held that a private right had been invaded, and that he was entitled to damages.

CHRYSANTHEMUMS in Japan are trained into numerous quaint shapes, like the old English yew-trees, in the forms of peacocks, &c. In Tokio there are gardens filled with life-sized figures made entirely of the flowers and leaves, the faces being masks, and these chrysanthemum figures accurately represent Court ladies, warriors, children, and animals, one of the favourite characters bein a young lady with a fox's tail peeping from under her dress, and a mask which by the touch of a string turns into reynard's head.

WE are glad to learn that the prize of Rs. 100, offered in connection with the Agricultural Exhibition lately held at Doomraon, has been awarded to Baboo Chunder Bhushun Dutt, a higher-grade officer of the Subordinate Establishment of the Bengal Public Works Department, attached to Eastern Soane Division, for his essay on Irrigation. Baboo Chunder Bhushun is an able and intelligent young officer, and his essay on Irrigation is but an earnest of the work that the public may expect from him. We hope his future will realise the promise of his past career.

CORK bricks have recently been introduced in some parts of Europe. The material used is a mixture of cork, silica, and lime. It is stated to be a very durable material, guranteed not to rot. It has the advantage of keeping out heat and cold. It is light in weight and easily applied. An interior wall might be made of it where an ordinary brick wall would be too heavy, whilst it would be equally durable and substantial. It is nailed up to laths as a covering under roofs, or for ceilings, for wall linings, and for underfloors, as it is said to be an admirable preventive of damp, and a a sound-preventive also.

THE Savannah Spinning and Weaving Mills, Pondicherry, under the able and successful management of Monsieur Gustave Cornet, the resident partner, are being greatly extended. For many months past large quantities of new and improved machinery have arrived by each French mail steamer, the *Tibre* on her last trip bringing several hundred tons. We notice that a piece of the public park has lately been added to the premises, which, nevertheless, have still a crowded appearance. The Savannah Mills are, we believe, not only the oldest, but also the largest Spinning and Weaving Mills in Southern India.

LAST year we heard a great deal about experiments that were being made by Government in the making of paper stock out of *kaing* grass. If we remember rightly the experiments were conducted at Maoobin, and samples of the outturn were sent to Europe for valuation: we should now like to know the result. It is one that should be made known, for, if successful, it might induce some persons, with spare capital, to make a venture in paper-making; and, if not successful, it will be valuable as showing the reason of failure and the chances of the undertaking. Every effort, successful or otherwise, made by Government to establish a new industry or improve an existing one, should be widely published. Information of this nature is always worth something.

IT appears that the Municipality can no longer give Red Hills water as freely as they have been giving it hitherto. The breach at the Red Hills was closed by a temporary ring-bund, and it was not advisable to allow the water in the lake to rise to a height sufficient to endanger this ring-bund, so the water has been kept down to a safe level, and Madras has, hitherto, had an ample supply. This state of things is now over, and, with the hot weather the water is falling below the level at which the municipal pipes will supply a sufficient head in the delivery channel. It is calculated that in about twelve days more it will be necessary to begin pumping, either at Koratoor or Red Hills, and this pumping will cost nearly Rs. 3,000 per mensem, so the supply of water will be restricted to domestic purposes. There is plenty of water. The only thing is, that it costs money to pump it into the delivery channel.

Selections.

THE TEA TRADE AND THE BUDGET.

THE course of the tea market has been largely influenced during the past four or five weeks by the rumoured intention of the Government to increase the duty. How the news got abroad nobody knows, but it reached Mincing-lane in the middle of February and created intense excitement. Prices immediately went up about 1½*d*. per lb., and for a long time the improvement was fully maintained, with a confident expectation that a much higher range of values would be reached. This seemed all the more probable because the statistical position is an exceptionally strong one, and various other circumstances combine to suggest a scarcity of supplies of good teas ere long. The result, however, has been disappointing, and despite the fact that all the surroundings indicated the probability of a further rise, the market has lost at least one-third, if not more, of the advance which took place during February. An impression seems to have gained ground that after all the tea duty will not be raised from 6*d*. to 9*d*. per lb., as hinted, and that the Chancellor of the Exchequer will augment the taxation on other articles, such as beer in barrels, and cigars, as well as the income-tax, for the purpose of raising the additional revenue he requires. Whether this is a correct anticipation will soon be proved. It need only be added that as a rule a Chancellor of the Exchequer is pretty well able to keep his own counsel, and that he does not let the substance of his proposals become common property six weeks or two months before his plans are officially made known. In this instance, however, his so-called proposal has become a matter of public notoriety, which seems to suggest that there may be no intention of raising the duty as predicted. In any case the rumour has not been disadvantageous to the Exchequer. Ever since it was spread about, the duty on every available ounce of tea has been paid. Over a million pounds weight—much in excess of the normal amount—has been cleared every day, and a million sixpences mean 25,000*l*. At this rate the revenue from tea would be 150,000*l*. a week, or 7,500,000*l*. a year, instead of 4,000,000*l*, as at present. Every additional pound cleared makes the deficiency which the Chancellor of the Exchequer will have to remedy less and less serious. The fillip thus administered to the revenue will, therefore, be a momentary advantage, even if the duty is left at 6*d*. per lb., as at present.

Opinion varies somewhat as to the effect of an augmentation of the duty. One large firm, writing to the newspapers, have expressed an opinion that the Government will fall into a grave error in increasing the cost of a "necessity" of life like tea. They say :—"It is a well-acknowledged fact that the poor are by far the largest consumers of tea ; that the qualities purchased by them range from lower to medium grades, and that the prices paid are from 1s. 6*d*. to 2*s*. a lb. ; therefore the extra duty if put on, they will feel as a direct tax, whereas the rich and well-to-do, who buy the finer qualities, paying from 2*s*. 8*d*. to 4*s*. per lb. for the article they consume, may still purchase first-class tea at the same price, in spite of the new duty, that is, if they are not inclined to increase the cost of living. An increase of 3*d*. or 6*d*. per lb. to the working-class population of our large towns will mean increased suffering in these times of depression and low wages. Even in the time of the Crimean War, when heavier taxation was necessary, the duty was reduced by 1*d*. per lb., thus showing that the Government of that day was alive to the necessity of keeping taxation off the poor. Increased duty will also have the effect of stimulating the importation of the filthy compounds known as 'lie tea,' which John Chinaman, with perverse ingenuity, used to favour England with in large quantities." The writer seems to fall into an error in assuming that tea is a "necessity" of life. The general impression, at any rate, is, that our "tariff for revenue only" does not tax necessaries, but only luxuries, among which tea is supposed to rank. In the opinion of many an increase in the duty would have only an infinitesimal effect upon consumption. Besides, there is no reason why the British workman, who pays nothing in the shape of income-tax, should not contribute in some way or other towards the expenses of the Soudan War. The Government, however, will be disappointed if they anticipate that the additional duty of 3*d*. will raise the revenue from this source from four to six millions per annum.

The statistical position of the tea market is remarkably strong, despite the fact that during the past few days values have not been maintained, because a few timid holders pressed their teas for sale. Some selling brokers offered to lend buyers money at the rate of 5 per cent, to enable them to pay duty upon their purchases, in anticipation of the duty being raised, but this was resented by the trade, and caused further depression. The true position of affairs is given in Messrs. J. C. Sillar & Co's circular of March 27, when they say :—"There is hardly any China tea now afloat, and the present state of the market is not such as to induce merchants in China to hurry forward shipments, even if they had the power to do so, which many of them have not. The River Min is closed, and if any steamship owners are bold enough to send their vessels to load next season, they will have to remain at Sharp Peak, at the entrance of the Min, and about 30 miles from Foochow. The French ironclads are also stationed at the mouth of the Yangtsze, and, as stated in our last, the 'Lekin' taxes have been increased both at Foochow and in the Northern Provinces." This latter statement requires some little explanation. The 'Lekin' taxes are commonly known to European residents in China as "up-country squeezes," and these are to be raised 3½ taels per chest at Foochow, and at Shanghai 4 taels ; this means an increase upon the laid-down price of all kinds of tea in this country of 2½*d*. to 3*d*. per lb. While an increased duty upon the import of tea in this country may check the consumption to an infinitesimal extent, if we are not mistaken the increased export duty in China will seriously interfere with our supply. Several other causes point to the probability of a scarcity before many months are over. The following figures taken from Messrs. Sillar & Co's circular show the clearances from the 1st to 24th of March, compared with those of 1884 :—

	Home Consumption.	Export.	Coast for Export.	Total.
	Lbs.	Lbs.	Lbs.	Lbs.
1885 ...	17,457,000	3,024,000	350,000	20,831,000
1884 ...	8,514,000	2,288,000	523,000	11,325,000

As to the probable available stock of Congou and Souchong in the bonded warehouses on June 30 next, the following figures for the last three years are important :—

1882.	1883.	1884.
Lbs.	Lbs.	Lbs.
50,586,000	45,840,000	39,494,000
(3,800,000 new season's.)	(8,400,000 do)	(3,800,000 do.)

This year it is doubtful whether the bonded stock on the date in question will be more than 22,000,000 lbs, and hardly a pound of new season's tea will be available. Such a return as this means really that there will be none at all, as, when the figures run so low, it is generally found that the stock is held by so many small dealers throughout the country on what is called "broken-weighted notes" that it is difficult, if not impossible, to make purchases on a large scale. Under these circumstances, it seems that those who put off buying at the present moment may regret it ere long. At the end of June, it is predicted, Congou will be worth 2*s*. per lb. in bond.

The Indian tea market presents much the same features as the China market. The statistical position is very strong, and the firmness of values has induced holders to put forward their stocks so freely during the last four weeks that the unsold part of the present season's crop is smaller than at this time last year by 6 or 7 millions of pounds. This is the best answer that could be made to the rubbish recently written in a society journal as to the poor quality of the Indian produce. The fact that last year it formed 37 per cent of our consumption, as against [illegible] per cent in [illegible]874, is also a fact worth noting.—*British Trade Journal.*

CREOSOTING TIMBER.

PERHAPS no gift of practical [illegible] has been greater than this process of [illegible] the odour of railway sleepers sufficiently [illegible] one way lies at the bottom of our travelling [illegible] in which this process has been dismissed [illegible] betokens the mood of the intelligent public [illegible] ies The modern Herr Dousterswivel is [illegible] He is expected as a matter of course to effect wonders [illegible] those of ancient Egypt by a generation who [illegible] "Give us results," it says, "never mind [illegible] If we don't get your results, [illegible] cautions, then [illegible] on your [illegible] uniquely successful exhibit [illegible] than that of James Ross & Co. [illegible] through our advertising columns [illegible] to prefer ready to hand [illegible] lettered Hodge could apply [illegible] time told, "Oh, steeping palings [illegible] so many yards with the brush, [illegible] from all such correspondents [illegible] an arrest of judgment. "Obey [illegible] "under which true success [illegible] the great timber-preserving works [illegible] tempting to preserve their own wood [illegible] prepared material cheaper. Why this is [illegible] an account of the method pursued at the [illegible] works of the French railway, *La Compagnie* [illegible] *Revue des Eaux et Forêts* for January.

The wood prepared for the process brought in [illegible] transit,—the large cylinders, in one case open, with [illegible] feeding waggons in which the creosoting is to be effected [illegible] waggons with this preserving material from municipal gasworks scattered over the country, and the necessary steam-engines and boilers for causing vacuums and injections within the cylinders are the main features of the picture But, as has already been pointed out to our readers, every such coal tar oil is not equally preservative. Indeed, much discussion prevails whether the preservative properties do not arise from the destruction of germs rather than the formation of solid material within the pores of the wood. There are two types of creosote in the market. The one called "London Oil" is made from the tars of the Newcastle district, and contains less of the carbolic and cresylic acids, but more of the semi-solid substance which solidifies within the pores of the timber and more of the antiseptics which only volatilize at high temperatures. The other, called "country oil," is obtained from the tar of the Midland and other coals ; and being lighter and thinner, and containing a larger percentage of these tar acids, was preferred by the late Dr. Letheby, for instance, as a preservative agent. If the destruction of germs alone solves the timber preservation problem, the good results noted in the *Albany Cultivator*, when wooden palings or buildings are thoroughly washed with crude petroleum, may be accounted for. In any case, the amateur requires skilled advice both as to the liquid used, and the method of its injection. Let us, then, turn to the experience of the great French railway company :—

At their most important sleeper-preserving works at Amagne, near Rethel, in the Ardennes, they employ fifty workmen, who prepare 500,000 to 600,000 sleepers yearly. The sleepers are

THE report for March 1885, on the prospects of the wheat crop in the Punjab, is as follows. Complete statistics of the area under wheat are, however, not yet available, and some of the figures are still open to correction :—"The area under wheat in the Delhi, Gurgaon, Hissar, Ferozepur, Rohtak, Simla, Jullundur, Hoshiapur, Kangra, Amritsar, Sialkot, Lahore, Gujranwala, Jhelum, Gujrat, Shahpur, Multan, Jhang, Muzuffurgurh, Dera Ismail Khan, Dera Ghazi Khan, Bannu, and Kohat districts is shown at 5,325,000 acres this year, as against 5,250,000 acres last year. In the remaining districts, Karnal, Umballa, Ludhiana, Gurdaspur, Rawalpindi, Montgomery, Hazara, and Peshawar, the estimates already received give 2,033,000 acres this year, as against 9,050,000 acres last year, but accurate statistics have yet to be received for the latter. In parts of Hissar, Jullundur, Amritsar, Lahore, Gujranwala, Multan, Dera Ismail Khan, Dera Ghazi Khan, and Bannu, the character of yield is described as below average. In the rest yield is either average or above ; a full average may be estimated for the province as a whole. Further details will be telegraphed on receipt of complete and accurate statistics."

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THE report for March 1885 on the prospects of the wheat crop in the Central Provinces is as follows :—"Prospects remain unchanged, except that in the northern districts the injury from rust has proved larger than was anticipated. Total approximate area for the provinces is 3,700,000 acres against a normal of 3,900,000 acres. Of these Saugor and Damoh contain 700,000 acres, the Nerbudda Valley 1,200,000 acres, the Nagpur country, including the Seoni district, 700,000 acres, and Chuttisgurh 450,000 acres. The total outturn, as roughly estimated, is 22,900,000 maunds against a normal of 22,500,000 maunds. The exports fell off during March, in which month it amounted to rather over 400,000 maunds, but it shows signs of recovery, and in the first week of April reached 150,000 maunds. No information respecting stocks is available."

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[illegible] report for March 1885 on the prospects of the wheat [illegible] follows :—"Wheat harvest [illegible] ver, area [illegible] yield generally about the average, [illegible] including existing stocks ; [illegible] available for export."

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[illegible] two years in the North-Western [illegible] both too little and too much [illegible] success. In 1883 the [illegible] deficient, and the result [illegible] injury to both [illegible] chief redeeming [illegible] September were inces[illegible] The ex[illegible] led soon [illegible] crops, [illegible] cotton and [illegible] two very valuable trade [illegible] luxuri[illegible] washed out of the [illegible] was affected in this way [illegible] before the excessive rains, [illegible] plants [illegible] the Cawnpore experimental station [illegible] easily [illegible] Rs. [illegible] every 100 Government maunds, whereas afterwards the same quantity would not fetch Rs. 21. The first bolls of the cotton were destroyed, and the crop gathered was of very inferior quality.

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A DISEASE, known locally as *Mora Basanta*, is reported to be causing great ravages among the horned cattle in our Eastern districts. The symptoms are stated to be as follows :—The animal attacked refuses its food : discharges of a viscid mucous matter from the mouth and nostrils follow, and are ordinarily accompanied by a skin eruption. Severe purging, with a very high temperature, are concomitants of the disease, which usually proves fatal on the third day. The people appear powerless to check the heavy mortality, and not unnaturally, look to the State for help and counsel. Every civilised Government, save our own, has recognised its duties in this respect, and maintains a highly-paid establishment for the purpose of coping with cattle-diseases. In England, an outbreak of rinderpest engages the prompt attention of the Privy Council ; energetic measures are taken to isolate the area attacked ; and experts are deputed to ascertain the nature and causation of the disease, and suggest a remedy. If these precautions are deemed necessary in England, which is in the main, a manufacturing country, how much more essential would they seem to be in the case of India, where the agricultural interest is everywhere paramount, and where, broadly speaking, cattle are still the only form of wealth ? And yet, what steps have been taken towards ascertaining the nature and cure of the various types of cattle-disease which yearly cause such untold distress, and (indirectly) so much crime ? We recollect indeed, many years ago, a spasmodic effort in this direction, in the shape of a vernacular pamphlet issued under Government auspices, and treating of cattle-diseases and their cure. It is, however, more than probable that the treatment therein laid down was wholly empirical : and it is certain that we know as little of diseases of cattle in the East, as we do of those which affect our own kind. It is surely time that the new-fledged Agricultural Department bestirred itself to wipe away the reproach that India possesses no organization for the purpose of combating these destructive maladies.

ENSILAGE.

IN an article last week on this subject, we gave some account of the origin and progress of silos in South Australia, and the manner of constructing them, together with the results obtained by experiments. It will therefore be interesting to see what measure of success has been obtained by similar experiments in different parts of the world. The importance of the question has been recognised everywhere, and we shall, therefore, we hope, be pardoned for dwelling at some length on this matter. We shall begin with Great Britain.

Mr. Kains-Jackson, in *his remarks on* the *Ensilage Show* at *Islington last December, says* :—"*Ensilage* has advanced in three years as much as have most other methods of farm practice in thirty years." This remark applies almost with as much force in India, for we find that printed papers, containing the results of several experiments, have been communicated to all local Governments and Administrations in view of trials being made, and silos being established all over the country. A writer in an English contemporary emphasises Mr. Kains-Jackson's remark quoted by us, observing that those who have tested the value of ensilage both for fat stock and dairy cows, can well understand the reason for this rapid advance, and there is no doubt that within a very short time silos, or ensilage stacks, will be as common on every farm in the kingdom as hay stacks. But the question to be solved is, which is the best and cheapest method of making ensilage, so as to come within the reach of every small occupier of land. It has been asserted that expensive masonry-built silos are unnecessary, and that ensilage can be made equally well, if not better, in cheaply-constructed wooden silos, or even in stacks without any *silos* at all. The question however, between the cheap wooden silos and stacks amounts to this, that whether or not the loss incurred by the extra waste round the sides of a stack, is not more than will pay for the erection of the wooden sides.

The writer goes on to say that when we consider that round the sides of a wooden silo there is, practically speaking, no damaged ensilage, the whole being fit for consumption, and that the wood for a silo 16 feet square and 12 feet deep costs only £7, and will at the very least last four years, he thinks there can be but little doubt that a silo is cheaper than a stack.

The foregoing remarks prove that in England at least, it is looked upon as certain that silos will, in time, take the place of the time-honored hay-stack, and that the constructing of silos need not cost large sums of money. In the earlier stages of ensilage experiments, an elaborately built silo was looked upon as indispensable, but the writer we have quoted would seem to have overcome that difficulty. Let us see what he has to say about the method, generally adopted at home, of filling in and weighing. He says that several different systems of weighing have been tried, and that there is no doubt that green crops may be preserved in various ways. Exclusion of air by hermetically sealing the silos may be efficient, but it is far too expensive for any practical purpose. Great pressure by means of simple screw power has also been tried, but not being continuous in its action, it could not be depended upon, and must be uncertain in its results. He thinks that builders of silos cannot do better than follow in the steps of those who were the first to put into practice this method of preserving green crops—*viz.*, that a perfectly continuous and self-acting weight to follow the ensilage as it sinks is necessary. In support of this, he quotes M. Goffart, who says—"Never lose sight of the fundamental principles which ensure success in ensilage—continued pressure to expel all the air contained in the silo. It is indispensable to put on the cover, or moveable planks, of the filled silo, about 100lb. per square foot of heavy matter, such as stones, &c. This great pressure ought to continue for several months, because the trampling down at the time of ensilage, however thoroughly carried out, is not in itself sufficient. At the time when the green fodder is put in, it is still living, and endowed with such elasticity that it re-acts strongly against the momentary pressure put upon it. It is not the same, however, after a few weeks or a few months; the fodder soon undergoes a softening which diminishes the elasticity, or, in other words, increases its compressibility to a considerable extent. It is when these physical and chemical modifications are accomplished that the heavy weights, which I have indicated as an indispensable condition to success, produce their salutary effect. They follow the fodder as it collapses, and produce that state of very high density which is so necessary to put it beyond the reach of deterioration."

The writer states that from experiments made by him on this subject of weighting the ensilage, and from knowing something of what others have done, he is firmly convinced that the system of continuous pressure, as advocated by M. Goffart and others, will ultimately prove to be not only right in principle, but the easiest and cheapest in practice.

The operation of weighting is of such importance, that we unhesitatingly recommend it to the notice of those engaged in ensilage experiments in India. There is so much truth in the statement made by this writer, that we are inclined to attribute the failures that have occurred in some cases to this point being overlooked.

As an istance of what an average sized silo would cost in England, we quote the estimate given by this gentleman:—

"For £24 I can buy from my carpenter the wood, including covering boards and planks, ready cut, for erecting a silo 20 feet long, 12 feet wide, and 12 feet deep, capable of holding 57 tons of ensilage, roof it with corrugated iron, and weight it with a press supplied by the Ensilage Press Company, Leicester, which gives a continuous weight, and is so simple in its arrangements that ordinary farm labourers can put it on and take it off in fifteen minutes. Allowing 30 per cent for interest and depreciation on the perishable part, and 10 per cent on the remainder, the cost for the silo and weighting per ton of ensilage per year is only 1*s*. 4*d*., not a verv ruinous outlay even in these depressed times. Probably my estimate for the wood will be found to be high rather than otherwise, for I am told that wood is dearer in my neighbourhood than in most other places, and in many instances, I think the cost might be reduced by farmers using some of the wood found on the farm without having to go to the carpenters for it."

With these facts before us, we are of opinion that a silo of similar dimensions would cost far less in India, where labour and material are much cheaper.

SEEDLINGS FROM GRAFTS.

UNDER the head of "Letters to the Editor," we publish a communication from the pen of Dr. Bonavia, on the subject of seedlings from grafts. Coming from such a high authority, the letter commands our best attention; but we would say a few words relative to the conclusions arrived at, and the theory formulated by such a distinguished botanist, who is at the same time an experienced horticulturist and agriculturist.

Our statement regarding the quality of seedlings raised from grafted plants was made from the knowledge gained by seven years' experience of this practice. It was found that in almost every case where seedlings were raised from grafts, they turned out of a degenerate species. We are quite in accord with Dr. Bonavia when he asks whether the hundreds of varieties of apples, grapes, oranges, mangoes, &c., among fruits, and the numerous varieties of our beautiful roses and other flowers, were all raised from seeds taken from plants on their own roots? It is true that these numberless varieties may have been raised from seed; but we shall, we think, not be far from the truth in saying that they were not all raised by seeds taken from grafts.

The system of hybridization has been carried to such an extent, and has reached such perfection, that raisers of plants at home and on the continent very seldom resort to any other mode of producing new and improved species. In nearly every class of plants, hybridizing plays an important part. It is only by resorting to this practice that we can hope to improve upon existing varieties. The causes which lead us to this conclusion are obvious. Take, for instance, our roses as an example. When a grower and raiser wishes to multiply varieties, or to bring out an altogether new kind, which he thinks he would be able to do by uniting the growth, health, constitution, and size and shape of a particular rose, with the colour of another, he hybridizes them, one with the other. In the same way with fruit, he selects an apple which has a good constitution and size, with other qualities that make up a desirable variety, but which lacks the delicate flavour necessary to render it a choice and popular fruit for the table. He therefore selects another, which possesses the latter, but not the former, qualities, and accordingly proceeds to hybridize them. The result will be, perhaps, out of many seedlings, a cross between the two, partaking of the qualities of both. We do not, however, think that the raiser would, for the purpose of producing a new variety, *graft* the superior on to the inferior, and expect to get an improved species from the seedling got from the graft.

It has been found in many cases that seeds taken from grafted plants do not contain that *vitality* and germinating power found in seeds from plants on their own roots. Again, it frequently happens that grafts do not seed, and when they do, the seeds are found to be imperfect, and fail to germinate. It is a well known fact, and one which we have often verified, that the orange and pomelo, if raised from seeds obtained from grafted or budded plants, give most unsatisfactory results. We have observed the same phenomena in the case of many other varieties of fruits, *e.g.*, peaches, plums, mangoes, &c. Were it otherwise, the native fruit-growers, who know the value of grafts, would propagate their fruit-trees from seeds, which would not only be an easier method, but simpler, and yield a larger return.

Nurserymen, in Delhi, Agra, Saharunpore, Lucknow and other places, invariably raise the superior varieties of fruit trees for sale by grafting and budding, and the inferior kinds from seeds for stocks. We have ourselves had a good deal of experience in this respect, and we invariably found that seedlings raised from grafts were of a very inferior quality—if not positively worse than the stock upon which the graft was made.

We have in this paper endeavoured to show what our own experience has been in this respect, and the conclusions arrived at from observations; but the superior knowledge, and more extensive experience of Dr. Bonavia give him an undoubted right to speak with authority on this subject. We are pleased to find that a comparatively unimportant remark of ours has elicited such an able paper, and as the subject, if thoroughly investigated, promises to become an important one, we hope our other subscribers and contributors will favour us with their views, not only on this, but other cognate subjects. We shall be very glad to open our pages to the discussion of matters relating to agriculture and the allied sciences; and if we can succeed in promoting a healthy discussion in the pages of the *Indian Agriculturist*, we shall not have laboured in vain.

arranged in piles sheltered from rain, but so as to allow the air to play freely through them to dry: after two years or so oakwood loses 20 per cent of water,—a sleeper weighing originally 81 kilogrammes will then be no more than 65 kilogrammes. The process begins by sleepers laid on little waggons being introduced into a hot-air stove in which the highest temperature is 75 degrees, the middle 60 degrees, and the lowest heat 40 degrees. After two days, the weight of each sleeper is reduced by 1 kilogramme and a little more, rarely 2 kilogrammes. The waggons are next removed to the injection cylinders, which can hold about 180 sleepers. These being hermetically closed, a vacuum of about 65 degrees is made by the air-pumps, and creosote admitted from a reservoir open to the atmosphere, and kept at a temperature of 70 to 75 degrees by means of steam. When the cylinder is full of the liquid to be injected into the wood, communication with the reservoir is cut off, and steam to the pressure of 5 killogrammes blown in. Five operations can be performed in a day in each cylinder, the time for each operation being about two hours.

Square oak sleepers from France, Galicia, and Russian Poland are used. When the oak contains little sap, it absorbs about 5 kilogrammes the sleeper; but Polish oak, which is a little soft, takes a little more in. This preparation costs 1 franc a sleeper. Since 1877, the railway company have mostly eschewed the more tender woods, as sleepers abounding in sap absorbed 17 kilogrammes of creosote. It is essential that the sleepers be thoroughly dried, and that they immediately pass from the drying stove to the injecting cylinder, as only in such circumstances can the liquid enter the wood vessels of the most refractory oak. The drying in the atmosphere should not be too long prolonged; and the use of the stove appears to remove the last traces of moisture. When too many logs are placed in the cylinder, the creosoting becomes unequal. The work has been done more satisfactorily by the company on its own account than when it was formerly given out to contractors.

In view of an increased use of various woods, more timber-preserving experiments on different varieties appear called for,—specially in relation to fences, wooden houses, and the like. In respect of freedom from lightning-stroke to which wire fences are so liable, creosoted wood fences claim attention from agriculturists and foresters. Messrs. Armstrong, Addison & Co. give more than one instance where cattle and horses killed by lightning were found lying close to wire fences.—*Forestry*.

ABORTION IN COWS.

Mr. Frederick Hood, M. R. C. V. S., Penicuik, having been asked by many farmers who had sustained losses by abortion in their herds, to give his views and experience in a plain, practical form as to the cause and prevention of this complaint, favours us with an interesting paper, the second portion of which we are obliged to hold over for a week.

Dealing with the history of the ailment, Mr. Hood says:—The continuance and alarming increase of this strange and somewhat disastrous disorder among the milking stock of this country, has excited the intelligent attention of veterinarians and stock-holders to a degree somewhat more lively than heretofore, and in a manner more calculated to afford something of a practical and logical solution of its many mysteries.

The importance attaching to a correct understanding of this condition cannot possibly be overrated, because, taking all other incidental diseases and losses amongst milk stock together, more loss, directly and indirectly, results from this one cause. The essential value belonging to the animal, namely, her milk, is more or less reduced, if not altogether stopped for the time being. The fattening and disposing and replacing of those unprofitable animals, the loss of the calf, together with the extreme difficulty in ridding the byres of the disorder during a period of four or five years after the disorder commences, are quite sufficient to demand an energetic and thoughtful study on the part of those whose duty it is more directly to contribute such.

The history of this disorder is contemporary with the history of civilisation. With the domestication of the cow, it has without cessation continued to exist. Among the ancient Greeks it was familiar, and one strange feature in its early history, as recorded by one of their most famous poets—a feature which I would especially draw attention to here, as exemplifying what is largely the case at the present day—namely, it occurred to a much more serious extent, the nearer we got to large centres of population. This, as I have already pointed out, and as I shall show further on, is largely the case in this country, and in others at the present moment. We must give due importance to the observations of this intelligent Greek. At the time of the Roman conquest of Britain it existed as an almost universal blight, and continued without interruption for several successive years, both cattle and sheep suffering. On the Continent it is thoroughly well-known in certain provinces, causing all but total destruction of the native stock. In our own country it has existed with greater or less severity as far back as history itself, and causes innumerable and curious were assigned for its origin—the evil influence of sun, moon, and stars—witchcraft—evil disposition on the part of departed souls, each having its believers and each having its own enchantment or charm as a protective influence against infection.

ITS AREA AND DISTRIBUTION.

Wherever the cow is bred, born, and reared in a state of domestication for the special purpose of giving milk, there exists the disorder. Over the length and breadth of the European Continent, India, New Zealand, Australia, the American States, Great Britain and Ireland, it exists in that form, apparently epidemic, besides the incidental form due to known causes.

In those extensive tracts of natural pasture in America known as cattle, ranches it does not exist nearly to the same extent—indeed, the losses from this cause among the stock pasturing on these pastures, and which are fairly looked after, is an exceedingly small percentage. With more or less accuracy this percentage can be calculated by the simple process of counting; given a certain number of cows, with their proportion of bulls, re-counting every year shows the additional increase, which can be easily compared with what it should be. Its existence, then, is almost universal, no country where the cow is under domestication being exempt.

PRE-DISPOSING CAUSES.

We have now come to a practical division of our subject, and for purposes of elucidation, and exhausting its consideration as much as possible, I propose to sub-divide its consideration into individual predisposing causes or sub-divisions.

BREED.

Of late much importance has been attached to breed as a pre-disposing influence to many incidental diseases among cattle; rightly or wrongly as this may apply to diseases distinct as disease, no incontrovertible rule can be sustained connecting abortion with breed; and it is by an entirely false rule of application to maintain and argue distinct relationship between the two. Now, this is a fact important to remember, because many farmers and dairymen have been induced to abandon one breed highly profitable as milkers for another breed of inferior quality, on the assumption that former losses from abortion would not be repeated with this change. Breed of itself has nothing whatever to do in the matter—one breed under equal circumstances being as liable to abort as another. But breed in relation to circumstances has a great deal to do with it, and to an extent far more true than many of us are prepared to believe. For instance, climate and soil congenial to one breed is not so to another. Again, certain breeds can stand a great deal of the selective process. What I mean by that is, that for the purpose of getting in a stock of cows capable of giving large quantities, I might almost say unnatural quantities of milk, none but the heaviest milkers are kept and bred off, selection after selection is made for years of the best in the stock, until a complete transformation is made in the character of the animal from what originally was intended by nature.

The cow, intended by nature to be a strong, lively, hardy, and enduring animal with large muscular development, becomes converted by this selective process into a sensitive, delicate, unenduring creature, whose muscles have been transformed into a huge glandular system for producing milk

Now, this abnormal development of one particular organ at the expense of the other parts of the body means weakness, means susceptibility to disease, means incapacity to perform the function of reproduction in a vigorous natural manner; the organs of reproduction which depend so much upon general vigour of the system, suffering in a manner much greater that the rest of the body; and that complex series of phenomena coincident with, and essential to, the development and maturing of the calf is faulty and incomplete; the excessive drain upon the substance of the general system to furnish material for milk, leaves little or nothing to spare for the formation of the young—a process requiring large supplies of the mother's substance.

But the evil does not stop here. This selective process, chronically weakening the reproductive organs of the mother, extends the imperfection to the young, who, in turn, extend it to theirs in an increased form, until, as has been over and over again observed, it becomes almost impossible to get certain cows in calf at all, the organs being utterly incapable of securing conception; and in many other cases when conception does take place and gone a certain length, the weight of the calf and the quantity of nutriment required is greater than the womb can supply, and hence abortion; to mature the calf farther is an impossibility, and nature rids itself of what, if retained longer, would prove injurious to the mother.

SERVICE.

It is within the knowledge of most who have to do with calving cows that unproportionate bulling has a pre disposing influence towards abortion. I will give the results of an unintentional experiment which was tried under this head, showing, in a clear and intelligible form, the influence unproportionate bulling may have. A dairy of 20 cows, of which were 10 Ayrshires of relatively small size, 5 pure shorthorns and 5 crosses, were served for some time by large, massive English bulls. The first year gave two abortions among the Ayrshires, and one could not be calved. During the second year two abortions again occurred with the Ayrshires; during the third year 4 Ayrshires aborted and 2 crosses; during the fourth year 1 shorthorn aborted with 3 Ayrshires; during the fifth and sixth years, circumstances were even more disastrous, as half of the Ayrshires could not be put in calf at all, and 3 of the remainder aborted.

Now, no other explanation could be reasonably considered other than that of disproportionate bulling, as previously abortion among the stock was rare—bulls of smaller proportions being used. Nor is it difficult, in a physiological sense, to account for such. Nature intended and has made provision for calves proportionate to the size of the mother; but when small cows are bulled with bulls as large again as themselves, the womb, or bed, is liable to collapse under the disproportionate weight, and eject the encumbrance.

Again, under this heading, we must include putting young cows too soon in calf, especially to large bulls. A quey put in calf at one year or fifteen months is certainly too soon, particularly the *smaller breeds.* The bed by such a practice is considerably weakened, the energies of the whole animal are unduly taxed: indeed the bed, during the whole of the animal's life, if regularly put in calf, is pre-disposed to abort, and hence one of the many obscure causes in animals, otherwise thriving and healthy, aborting without any known cause.

Super-pureness in breed is another pre-disposing influence towards abortion. With cows, as with all other animals, over-refinement means over sensitiveness to disturbing influences; whatever is prejudicial to the general habit or constitution of the animal, and extremely little is required thus to affect pure-bred animals, tells more or less directly upon the reproductive powers of the animal.

SOIL AND CLIMATE

Have been shown to have distinct influence upon this disorder. I am alluding altogether to conditions of soil apart from marshy ground, or where wet miry pasture nearly continually exists, because, as I shall point out further on such pastures are direct exciting causes towards the disorder. What I allude to here is the question more of elevation and soil markedly reproductive of weeds, and more especially growths of the fungoid type. I will also attempt to show what influence certain artificial manures exert directly or indirectly in producing conditions favourable to abortion.

In the first place, then, districts situated at low elevations are more prolific in producing conditions favourable to abortion than high elevations; this is markedly exemplified on the Continent, where cattle grazed and housed on the low-lying plains abort to a much greater extent than animals at higher elevations under similar conditions. Again, on some of those extensive, flat, low-lying tracts of country situated in the midland and southern counties of England, abortion is of common and disastrous frequency; whereas, on the hilly tracts of southern Scotland and in the north and west Highlands, its occurrence is almost altogether accidental.

With reference to the abortive tendencies of certain weeds, especially of the cryptogamic sub-kingdom, I consider it impossible, in a short general treatise, to exhaust a matter upon which great and varied experiences exist. In a separate pamphlet, which the subject sufficiently merits, I shall endeavour to lay down those various experiences, and also experiments, carried out in a practical and scientific manner, by two or three illustrious veterinarians on the Continent. Suffice it to say here that all weeds grown upon soil regularly cultivated and manured with artificial manures are detrimental to the general physical health of the cow, and some of them, indeed many of them, directly alter the physical energies of the reproductive organs.

The part played by artificial manures in establishing influences and changes of animal conditions favourable to abortion deserves attention. In a recent publication evidences and comparisons were given of the relative tendencies induced towards disease in the human being between our own artificially-grown wheat and that of natural growth from America, Russia, and the Colonies. It was attempted to be shown that were nothing but *home artificially-grown* food obtainable, disease would be universally rampant. I do not for one moment ask you to believe this statement as being absolutely correct; but I would certainly point out that although this statement is not the whole truth, it contains truth, and truth which in its essence is markedly selected and expressed in our lower animals.

In feeding with artificially-reared food and artificial feeding stuffs generally, we produce an entirely new adaptability within the animal; to make use of such we induce processes and habits of digestion not in strict harmony with the laws of nature. We cause a departure from nature's originality, and invite all the forces of the animal, which hitherto had been and were intended to be equally distributed over the whole system, producing suitability and perfection in each department, to be concentrated in the processes of digestion, elaboration, and absorption of those foods. Now, no such monopoly can exist in any animal economy without involving weakness; and the function of one system is indirectly, yet often seriously, involved—namely, the reproductive. Not that its forces are destroyed, but in sympathy with the other systems which have now become altered, it naturally partakes of the same transformation; and it is an infallible rule in all animal economy that if you depart from the natural standard, as first created, you entail weakness and inadaptability to perform healthy function.

Accepting the doctrine enunciated by some of our most eminent physiologists, and believed in by others equally eminent, that reproduction is a wise contrivance of nature to make substantial use of the excess of strength and nutriment within the animal economy—that is, that an animal full grown and developed requires much less nourishment than when in the growing state, hence nature, abhorring all principles of wastefulness, developes the reproductive organs as a wise outlay for this excess—now it stands to reason that perfection in these organs, and in those processes accomplished by those organs, can only exist when all other parts are relatively perfect, performing their functions free from friction. The moment we depart from the natural principles of feeding an animal—whether for the specific object of making milk or making beef—we produce changes of condition within the animal, and those changes can never be *for* the better; certainly the desired ends may be attained, but all this entails friction—altered conditions of function, and the deprivation of the animal of a large amount of that strength and vigour so absolutely requisite to reproduce its species in a perfect manner.

Now, it would be exceedingly credulous on my part to expect that all artificial methods of feeding cattle could be done away with, and equally simple would it be on my part to recommend such. But, what I would urge is, that much may be done to mitigate the effects without seriously interfering with the objects directly sought. This, however, I shall consider further on.—*North British Agriculturist.*

INDIAN RAIYATS AND THE VILLAGE COMMUNITY.

(*Indian Forestry.*)

In your November number, a letter was written by "A. W. P." in the hopes of throwing some light on "the difficult problem of the regulation of cattle grazing" by a discussion in your paper. I thought at the time of reading his letter, and the very pertinent remarks that it contained, that I would add a rider to my own somewhat lengthy treatise on the "Deccan Pasture," which if it has not met the fate it merits in your waste paper basket, may be of some use to "A. W. P." I did not, however add anything to that treatise, as I felt sure that some one would certainly have given your paper their ideas before this. Now that the February number has appeared, and still one writes, I have done so, as it is a subject in which I take a very great interest.

With reference to the first question, *viz.*, was there an original arrangement for each village before British rule by which its own tract of forest was preserved as a source of wood for fuel and other domestic purposes besides grazing, &c.? Now I should say that no such arrangements ever existed, or we should certainly have seen it recorded by such officers as Grant-Duff, Francis, those of the Inam Commission, and authors of the village communities. In the first revenue reports for Satara and other Deccan Districts bordering on the Western Ghats with their immense forests, no mention is made of any communal system of forest protection. Whilst looking up the records of a Native State in the Konkan with the Kharbari, for the purposes of discovering what rules existed regarding forest lands, we did not find any that could lead us to imagine that communal forests existed in the past, or anything that had even a semblance to them. What did exist, and of which there is ample proof both in the Deccan and Konkan District records of English origin and the older native ones, was a keen appreciation of the value of timber and other forest produce. That this was so may be gleaned from the royalty on trees. Looking at old Sanads granted by the Peishwas, I find that only in very special cases was the right to forest produce as timber, &c., alienated from the Crown. Does not this show that under governments anterior to British that the Government was supposed to be the proprietor of all forests, and of certain trees even that were not in forests? Of course lax supervision may have existed, but that the then government farmers or collectors of revenue exacted heavy mail on the forest produce goes without saying, and I therefore certainly agree with "A. W, P." that the forests in certain places were preserved owing rather to the fact that the population was more sparse and tenure of property less secure than at present. The rulers of the land who were proprietors of the forests, of course, did not object to the clearing of jungle for cultivation, as it paid them, still they never admitted the right of a commune to any forest produce beyond the free pastures of our present "mufat" lands, which are very limited in area.

The above necessarily entails my saying to "A. W. P." that there were no restrictions against people cultivating or grazing in forests, provided they paid their way under the native regime. Now it appears that even this restriction was removed under the British rule, and a premium put on the destruction of forest tracts. I know of several cases of forests having been thus destroyed under the British rule, that had been fairly well preserved under the native. That this protection arose from any foresight on the part of the native governments I am not ready to admit, but it was one source of protection.

I saw the statement once made in an administration report that a man lost his hand if he cut a teak tree under native rule; that this remark was true for the forests where the Angrias held sway I firmly believe, as I have heard the same on good authority, but then this punishment referred to large trees fit for ship-building. Probably the rajahs of old took similar precautions to ensure getting timber for building their palaces, for get timber they did, and of a size that one scarcely ever sees in the same place now-a-days. Sir William Wedderburn with all his love and keen appreciation of the native's good qualities, can never make me believe that the old native governments were patterns of peace, wiseness and moderation with local self-government boards to look after the forests in each village.

"A. W. P." is right when he thinks that there were pieces of land outside the limits of a village. They exist to this very day, and there are many such pieces in the Deccan. They have of course under our present orderly government been constituted lands belonging to no particular village, and generally go under the name best suited to the locality, with the prefix or affix of "sheri." The derivation of this term I do not know for certain, but I have been given to understand that it refers to "dispute." It merely means that these lands, some of which are entire forests, belonged to no village at all, and that when pressure of cultivation in their neighbourhoods gave them a local value for grazing, &c., several adjoining villages began to wrangle for them. This would tend to show that previous to the wrangling, village boundaries were not conterminous at any rate in the locality of these lands.

"A. W. P." says he has not seen Mr. Lee Warner's paper, "Persecution on the Weestern Ghats." I read it some months after it had appeared no one seems to have taken much notice of it. It was certainly beneath contempt, for a more offensive pamphlet written by an officer in Government service I never had the misfortune to read. It treated on a subject of which the author was piteously ignorant, when he broached the scientific points of kumri cultivation.

"A. W. P.'s" remarks regarding free permits need none from me. Forest officers know that every word he says on the subject only makes them see more clearly that the proper person to issue free grants is the forest officer, and not, as remarked in the last Bombay Administration Report, by the Conservator of Forests,

N. C., an official who wishes to gain cheap popularity by giving away property for which another is responsible."

"A. W. P." asks what are the best regulations for managing grazing? I have given my opinion, based on an experience of only seven years, it is true, in the pamphlet on Deccan Pastures, and I therein advocate contracts for places where forests are large and supervision inadequate. Given a strong protective establishment of say one beat guard to every 4 square miles, then the fee system will be found infinitely more paying and more easily controlled perhaps than the grazing under the contract system is. Now registering by branding and marking cattle is out of the question. Just fancy the work! For each year a new brand would have to be made, poor brutes! A buffalo of 10 years' standing would look a sorry sight. I have some three lakhs of grazing in my present Division, and I think that about six lakhs of cattle graze on it. What would be the cost of branding these animals? I strongly recommend Divisional Officers to make the range officials issue printed passes to each man desiring to graze his cattle, with the number and kind entered thereon, and on the back of the pass an intimation should be printed to the effect that the person who tends the cattle must carry the pass on him. The Divisional Forest Officer has plenty of chances of dropping down on the grazier, let him then count the cattle and examine the pass. If anything is wrong the Divisional Forest Officer knows what to do, if he does not he is not worth his pay. One or two good examples that make all involved smart will very soon produce the desired effect, *viz.*, that of Government of the present day protecting its forests and its grazing as of yore without the aid of any village communes.

R. A. Fagan.

Nagar, 27th February, 1885.

REFINING OF SUGAR IN CUBA.

Its Feasibility and Advantages from a Cuban Point of View.

In the *Neuva Era* (Roque) is an article, in which the writer of it discusses the *pros* and *cons* of the question. Many things look well on paper which do not hold good in practice. The cost of coal in a British or American refinery is a serious item, which the writer contends would be saved in Cuba, as megass would be burned. The cost of labour he estimates at one-half of what it is in the "States." In the case of the ordinary labourer this, no doubt, is so, so far as the cost per day goes; but what about the cost of skilled labour? The writer does not allude to the first cost of the plant, and, what is even more serious, the cost of keeping that plant in repair, which, we should say, will be three times what it is in England.

We should like to see the experiment tried. In these days it is not safe to say that anything cannot be done—but will it pay? We fully admit the force of many of the points which the writer of the article puts forward in favour of refining on the spot. We give a translation of the article:—

In spite of the general conviction, both in the United States and here, that it is not feasible to carry on economically the refining of the product on our sugar estates, the more we study the question, the more do we fail to find a single fact which would lead us to agree with that opinion, unless it is our want of practice and the knowledge of the best means of effecting the operation. Even supposing that it were necessary to confine ourselves to the same means and processes as are used by foreign refiners, we do not understand on what grounds can be based *an exclusion* which is injurious to the interests of both producer and consumer. The separation between the production of the raw material and its manufacture is intelligible, but it is inconceivable that a manufacturer should leave his work unfinished because he cannot finish it complete in one operation, and allow others to undo the product of his labour, in order to obtain a fresh profit, thus burdening the production of the article with the loss incident to a double manipulation.

The apparatus which the foreign refiners employ are not affected by climate, and would work here equally as well as in any other country. Labour at the old price costs one-half less than in the United States. The refiner has to buy the coal which he employs to convert into steam the water which is indispensable in refining our product, and however little per ton it may cost, it is an important expense which the producer here can save; for the bogasse of the cane which is worked up supplies all the fuel. The refiner suffers a considerable loss by the destructive effect of the sucrose of the second working—a loss which, in the refining of beet-root sugar, is calculated at 5 per cent, and if that on our products is less, it consists in this, that we sacrifice an equal amount to supply the Refiners' League of the United States with a product which polarises 97 to 99, whilst the white sugar which is sold there to the public frequently does not exceed 93—a sacrifice which, in the majority of cases, we make unconsciously—so that the difference between the refiner here and there is equal to the loss of 10 to 15 per cent of all our crop of sugar. The climate of this country is more favourable to clarifying, since our competitor has to obtain by artificial heat what the sun supplies to us here gratuitously. The tropical producer has every advantage in his favour, since he can save all the expenses of the second working, *minus* that of the movement of the bone-black in which operation he economises the half of the cost of labour, being able also to produce the black at less cost than here.

To all this there is a further important advantage to be added. It is well known that the purer the syrup the greater the production of sugar, and the less the yield of molasses; a difference which, in itself alone, compensates for the employ of bone-black, always provided it is effected with due economy.

It results, then, that we can avoid or *make up for* ALL the expenses of refining abroad, and sell white sugar which polarises 97 to 99. That is to say, that we can produce the refined at about the same cost as centrifugals cost us to-day, gaining 10 to 15 per cent in the quantity produced.

We have in England a free market for this product, of which the refiner of a neighbouring country (the United States) now gets the advantage, and although it is true that he enjoys an indirect bounty in the return of the duty which the Government makes to him he pays double freight, commission, &c., whilst the producer of the article here can send it direct at less cost. This being so, we do not understand why the planter of the Island of Cuba should persist in protecting, on its actual market, the worst enemy which he has for the class of product which he supplies; for it is the refiner in the United States who does the most to impede the reduction of the duties in this country, and who is the only one who is interested in making obligatory the production of an inferior article. Before mentioning another proceeding which dispenses with the use of bone-black (an advantage of which the refiner is deprived by the density of syrup which he works up) we give an extract from a letter of the Commission nominated to investigate the adulterations, which are prejudicial to this industry.

It says:—"As one of the Commission nominated to investigate the polarization of refined sugars, I have to testify that after a minute examination, I have found that my former communication was about correct; for it results that the superior kinds of refined sugars do not exceed 96 per cent, and the remaining 4 per cent are owing, not to adulteration as previously supposed, but solely to water. The inferior grades polarise as low as 88 per cent, and the impurities in these sorts consist exclusively of an excess of molasses whitened in filtration through bone-black, and this is attained by giving a very fine grain and effecting the granulation at a very low temperature, which generally dose not exceed 109° Fahr. and never exceeds 120°.

I am completely convinced that some refiners are in the habit of mixing white Louisiana sugars with inferior products before refining, to reduce the quantity of molasses. For example: if they are melting sorts which polarise 86 to 88 they mix them in equal quantities with those of Lousiana, which polaris, 93 to 99, forcing these to appropriates a proportion of the molasses of the inferior sugar, obtaining thus a quality which only polarises 93 to 94. The difficulty in this operation is to get a sufficient quantity of the Louisiana product.

Here then is the explanation of the urgent need of the refiner obtaining in this market centrifugals of a high polarisation, causing the producer to convert 8 per cent to 10 per cent of the sucrose into molasses, forming an exceedingly coarse grain to convert it into fine grain, and sell 7 per cent to 8 per cent of the whitened molasses to the consumer as pure sugar.

That which we have brought forward up to now refers only to the case were the planter would be obliged to have recourse to the methods of operation employed by the refiner; but our arguments will have greater force the moment that he shall have at his disposal a much simpler, more econmical, and more perfect process, such as, if our own information is correct, the discovery made by Dr. Icery and improved on by his successors.

We have at different times treated on this process, and shall now confine ourselves to saying that it is restricted to the separation by chemical means, in the state of cane liquor, of all impurities and colouring matters, reducing the juice at the first clarification to a simple mixture of sugar and water. This plan scarcely requires any addition to the apparatus in use at present, and to a great extent avoids the inversion of sucrose during concentration, an enormous advantage over the refiner, who, if we mistake not, is debarred this benefit by the density of the liquid, to which economy in fuel obliges him to confine himself.

One of the sorts of refined sugar most in use is a white centrifugal which is prepared at about the same cost as the common centrifugal, since it is sold without being dried, and the *terron* can be manufactured without the expensive claying and clearage.

Whatever may be the quality of the product, the refiner, from motives easily comprehended, requires a package of small size and easily handled so as to find favour and a rapid sale. The consumer prefers to buy wholesale, but not in excessive quantities nor in a package which cannot be easily transported, and which would disturb his household arrangements, and the best refined sugar in the world, if it does not answer these requirements, is at an exceeding disadvantage, because in the English market it is above all necessary to consult the convenience of the buyer. The custom of packing in sacks allows these to be used in place of casks, the obtaining of which in the island of Cuba presents some difficulties, not however insuperable, because they may come like the barrel staves from abroad.

All the modifications introduced into the manufacture during the last 15 years have been remarkably instrumental in preparing the way for refining on the estates where the sugar is produced, and the establishment of a modern refinery in the country will contribute to the change by demonstrating the possibility of doing so. It is to be hoped that before long those who have initiated this work will succeed in completing it, by adding a mill to the present plant and buying cane sufficient to boil down the product, avoiding the evaporation, unnecessary in this country, of the added water, and saving the greater part of the costs which are at present incurred by substituting bogasse for coal.

We hope that we have said sufficient to induce a more profound study of such an important question, not simply because it may increase the producer's profits, for the solution would involve another still more important. For some time sugar refining in a neighbouring country (United State) has ceased to be an industry in the true sense of the word, and become converted into a monopoly which prejudices the interests both of producer and consumer. It commenced by destroying the old sugar trade of the United States, which formerly lent its capital to the planter and assisted him in avoiding the sacrifice of the just value of his crops; and it is to-day the greatest hindrance to the producer in improving his processes, by means of differential regulations, which compel him to convert himself up to a certain point into a manufacturer of molasses, destroying the better product, which had cost him so many sacrifices, to increase the profits of others.—*The Sugar Cane.*

EUCALYPTOGRAPHIA.

Ferd. Von Muller, has inaugurated a practice, alas! too late, to save the lives of many similar explorers either into new paths of geography or science. He has had the courage to stop his great work on Australian Eucalypts with the tenth decade just issued. Although from twenty to thirty species still remain to be described, they are so widely scattered, and apparently so unimportant, that the author feels delay in the completion of the present work to overtake their full diagnosis would only render it antiquated; so fast are facts and experiments of Eucalypt-growing in the most widely-scattered countries accumulating, that a new treatise will soon be imperative.

Amongst the chief trees figured and described in this decade are *E. acmednoides*, "the White Mahogany" Eucalypt of New South Wales; *E. caliophylla*, a close companion in the forest with the Jarrah; *E. eugenioides*, known in Queensland as the "White Stringybark Tree," attaining a height of about 200 feet; and *E. redunca*, "Wandoo" or principal "White Gum-tree" of West Australia, yielding seasoned wood, weighing about 70 lbs. per cubic foot. It also describes *E. stricta*, foundon the most elevated spots of the Blue Mountains (3,600 feet high), which is usually only 3 feet high, though it is sometimes found as tall as 20 feet.

Eucalypts should be felled about the close of the Australian summer, as the flow of sap is then least active. Care must be taken that the stems be not too severely shaken as they fall, if possible towards underwood, and away from stony or rocky soil—otherwise the value of the timber is deteriorated. This again should be sawn up at once after felling. The density of the wood prevents it being seasoned in ordinary fashion. Logs 3+2 inches should be covered over with sawdust for three months; those measuring 12+12 inches treated in the same way for twelve months; and this will prove abundant seasoning.

Mr. Brown has raised some thousands of Eucalypts by planting seeds in hollow stems of bamboo, or of *Arundo donax*, in which earth has been inserted, and which are afterwards placed vertically together. Young seedlings should be the height of a hand's-breadth when transplanted, the roots being dipped in a puddle of earth and warm water, and partly left open. When sown in the open field, the side is first turned over by the plough, and a few seed grains planted at spaces four or five feet apart.

The purified Eucalyptus oil is not poisonous, and may be taken internally. It remains for some days undecomposed in the human system, according to evidence of the breath, but readily increases the temperature of the body by 2 Fahr. Abundant evidence is adduced in this volume of the therapeutic powers of a tree, to whose leaves the Baron applies the scriptural quotation "of being for the healing of the nations." Natives have by them, when steeped in hot water, closed ugly abdominal spear wounds in six days; professors testify to their relieving of ague pains and acute rheumatism; in some agues, Eucalyptus oil is placed before quinine; and it may replace carbolic acid in surgical operations.

The "Manna" Eucalypt, and the "Water" Eucalypt, from whose roots thirsty travellers are oft refreshed, are figured in this volume.—*Forestry.*

WOOD FOR WAR-SHIPS.

The modern representatives of old Vulcan have not yet displaced the forester as a supplier of war material. Our great armour-plated turrets must have teak, or a similar wood, in some parts of their holds. If our Indian supply cannot avail for our needs, experience only points to *Oldhania Africanr*—African teak—once largely imported into Liverpool, now unavailable at easy distances on the shore, and the greenheart of British Guiana, as yet to be made an article of merchandise. Our Clyde and London steel building shipyards, now working night and day on Government contracts alone emphasize the importance of this question. Here, too, is a plea for such special Exhibitions as the late International one; and a very strong reason why permanent exhibits bearing on this very topic, now warehoused for want of funds, should at once be laid open for patient study.

Indian teak has bulked into prominence within the last quarter of a century. But the recognition of its money value almost dates contemporaneously with its introduction into commerce, hence rise in price and demand have almost been coincident. In Europe, the loads from 1874 to 1882 have ranged about 41,000, with one glaring exception, whilst the price has kept £13 per load, with the same difference. But in India there have been much wider oscillations. There the price has gradually precluded its use in railway operations; the Australian Jarrah becoming a rival. With us, a steady price means a continued adaptation of the wood to new uses. The growth of our commercial iron shipbuilding industry has, doubtless, been one factor. And now the stern necessities of war continue the demand, despite our long commercial depression. While, then, the forests of this tree have had most telling inroads made on their area during the last decade, be it remembered that the high teak forest tree, the only one worth noting in this discussion, takes 80 or 120 years to grow—what then of supplies in the interval? The Forest service of India is here recognised as more than a necessity for its great country alone. It must solve this imperial question. For no extension of transport facilities from neighbouring countries can displace an Indian supply.

Mr. Simmonds's essay on this subject, given in the *Journal of the Society of Arts*, February 27, may be consulted by those wishing the statistics of the question. The following quotation must suffice:—

"Out of the total exported from India in 1883, 55,519 tons were shipped from ports to British Burmah, principally Moulmein, the rise in price from £7 6s. to £8, 9s. per ton was said to be due to the falling off in the supplies of first-class timber and to the great difficulty which exists in getting the logs to market. The total output of teak in the year, as shown by the coasting trade exports, was 113,391 cubic tons, Bengal and Bombay receiving the bulk Madras and Sindh taking only 15,000 tons. Great Britain took about 49,000 tons, and small shipments were made to Gibraltar (probably for orders), Ceylon, Sumatra, the Straits Settlements, and the Cape Colony. In 1884, 122,861 cubic tons of teak were brought coastwise into India. This is all sent from Burmah to Bengal, Bombay, Madras, and Sindh, and the quantity thus consumed in the country is far larger than that exported to foreign countries.

"The rise of prices and decrease in the quantity shipped abroad, are an indication both of the increasing scarcity of this timber, and of the larger demand for it which has been created in India by the progress of construction. The scarcity, it must be said, is as yet manifested only so far as regards large logs; inferior and small logs are abundant enough still. Moulmein has already been deprived by Bangkok of this trade which it possessed until recently. The value has more than doubled in the last five years, owing to the large timber, convenient to the rivers, having now disappeared.

"The quantity of teak imported, by land, into India, was, in 1880-81, 116,737 tons; in 1881-82, 107,433 tons; in 1882 83, 131,714 tons; and in 1883 84, 180,205 tons, valued at £1,035,340."—*Forestry.*

THE FORESTRY CENSUS.

A writer in the *Philadelphia Press* summarizes the results contained in the concluding volume of this national undertaking:—

"Our forest wealth must be enormous to supply this immense annual yield, but how long it can endure this great and steadily-increasing drain is a question of vital moment. In regions lying along the coasts of both oceans, where the climatic conditions are most favourable to timber growth, the cutting of trees which have reached their prime entails no loss, and, if judiciously worked, permanent and productive forests could be maintained with profit in regions better adapted to their growth than to agriculture. When the prosperiety of the State of Maine—founded on her once uninterrupted forests of spruce and pine—was threatened by wasteful cutting and burning, the forward-looking people of that State realized the danger, and a vigorous public sentiment soon operated to protect the scattered remnants of her primeval woods, and now the forests which were once held to be practically exhausted yield a large annual product. The example of Maine proves that original forests can be preserved and new ones established when the entire community realizes that they are essential to material prosperity. But the forests which are sensibly and economically managed are discouragingly few. The white pine, our most important timber tree, has already practically disappeared from New York and New England, and little merchantable timber of this kind can now be found in Pennsylvania, where the pineries once seemed inexhaustible. The maps in this volume show that the forests of Michigan, Wisconsin, and Minnesota which now furnish the bulk of white pine produced, are dangerously near to exhaustion. The best walnut, ash, cherry, and whitewood have already been culled from the hardwood forests of the Mississippi Valley. At the present rate of consumption the redwood forest of California will soon lose its commercial importance, and the extermination of the forests of the interior Pacific region seems inevitable.

The wasteful turpentine industry in the forests of southern pine, leaves the trees that have been boxed not only of inferior quality for lumber, but the trees, weakened by these gashes, are easily blown down by the first strong wind, or burned up by the fires which sweep through the resin-soaked debris. In the Southern Atlantic region and in the Californian mountains, roaming sheep, cattle, and horses destroy the hope of future timber growth by browsing off the seedling trees and barking the trunks of larger ones. Herds of swine tear up the young pines for their succulent roots and feed upon the edible fruit of many species. Worse than all, from burning brush, abandoned camp-fires, sparks from locomotives, herbage and undershrub burned over to improve forest pasturage and various other causes, fire is let loose in the woodlands, causing untold loss of timber directly, besides burning out of the very soil the ability to support forest growth, and leaving trees of the first economical value to be replaced by inferior species, like dwarf birch, popple, bird cherry, scrub oak, and lodge-pole pine. In our own State of Pennsylvania the immediate loss by forest fires during the census year was more than 3,000,000 dols., and more than 1000 square miles of woodland were burned over.—*Forestry.*

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Crop and Weather Report.

[For the Week ending 29th April 1885.]

General Remarks.—Slight rain has fallen in parts of Madras, Bombay, the Central Provinces, and British Burmah. In the Punjab the fall has been general, except in a few districts. In Bengal rain fell in a dozen districts, but more is very urgently wanted throughout the Province. In Assam the fall has not been so heavy as in the two previous weeks.

Prospects remain unchanged in Madras, while in Mysore they are dependent on timely rainfall. Fodder is scarce in the latter Province. In Coorg the crops are in good condition.

In parts of Bombay the *rabi* harvest is still in progress, and preparations for the *kharif* continue. Scarcity of drinking-water and of fodder exists in places. The *rabi* harvest has been nearly completed in the Central Provinces and in the North-Western Provinces and Oudh, and is in active progress in the Punjab. Threshing and winnowing are in hand in the two former Provinces, and *kharif* operations have also commenced. In Hyderabad the harvest continues ; and threshing has been completed in the Berars, where *kharif* preparations are taking place. In the Central India and Rajpootana States the harvest is over in some places, and continues in others.

Agricultural operations are progressing unsatisfactorily in Bengal, owing to the want of rain ; harvesting of *boro* paddy continues. In Assam sowings have been nearly completed, and prospects are generally good.

The existence of cholera, small-pox, and fever is reported from nearly all provinces, though the public health is generally good.

Prices show a tendency to rise in Bengal, and are unsteady in the Punjab.

Madras.—General prospects fair, except in parts of Bellary and Anantapore.

Bombay.—Slight rain in parts of six districts. Standing crops slightly damaged by floods in parts of Kurrachee ; *rabi* harvest still continues in parts of Surat, Shikarpore, and Upper Sind Frontier ; preparations for *kharif* crops in progress in parts of five districts. Scarcity of drinking-water continues in parts of seven talukas of Dharwar and four of Belgaum, and of fodder in parts of three talukas of Dharwar and four of Belgaum. Cholera and small-pox in parts of thirteen, and fever and cattle-disease in parts of nine districts.

Bengal.—Rain fell in a dozen districts ; it is very urgently wanted throughout the province. Agricultural operations are consequently not going on favourably ; they are stopped in some places and standing crops have suffered ; *boro* paddy is being harvested. Prices of food-grains show an advance in many districts. Public health generally good, though cholera and small-pox prevail.

N.-W. Provinces and Oudh.—Harvesting nearly completed. Markets well supplied and prices generally steady. Isolated cases of cholera and small-pox in some tahsils in Allahabad, otherwise public health fair.

Punjab.—Rain general throughout the province, except in the Delhi, Umballa, and Umritsur districts. Health good ; a few cases of cholera at Sirsa, Lahore, Umballa, and Delhi districts, chiefly among pilgrims from Hurdwar. Crop prospects generally good, but damage to wheat expected in Sialkot district if more rain falls there ; prices fluctuating.

Central Provinces.—Weather continues uncertain. Prospects unchanged. Cholera in Hoshungabad, Nimar, and Raipore ; fever in Seoni. Prices steady.

British Burmah.—Slight cholera and small-pox in a few districts, otherwise public health good ; health of cattle generally good.

Assam.—Weather cool. Sowing of *aus* crop almost over ; prospects good. A few sporadic cases of cholera in the neighbourhood of Sudder station reported.

Mysore and Coorg.—Crops in good condition. Prices of food grains stationary. Prospects of season and public health good.

Berar and Hyderabad.—Weather warm. Threshing of *rabi* crops completed ; preparations for *kharif* progressing. Wheat 22 and *juari* 26 seers per rupee.

Central India States.—Weather seasonable. Health good. Harvesting continues.

Rajpootana.—Weather seasonable, with cool breeze. *Rabi* harvest operations progressing.

Nepal.—Weather hot and dry. More rain wanted for the spring crops.

Letters to the Editor.

DESTRUCTION OF RATS WITHOUT INJURING TREES.

TO THE EDITOR.

Sir,—In a recent issue of the *Indian Daily News*, "A Florist" asks to know " how to get rid of rats without injuring the tree."

In reply, I would inform him, through the medium of your journal, of the method which my late father, Baboo Poran Chundra Dutta, the then principal flower merchant in British India, adopted successfully. He found in his Ooltadangha and Soorah plantations in 1870 that rats did considerable damage to the young Australian and country seedlings ; but he succeeded in keeping them off from plants by simply putting round the root one or two pods of the cowhage (*Mucuna pruriens.*) The cowhage is a pod covered with stiff bristles, which, should they touch the hand or skin, cause violent itching. The pod is generally known to Europeans in this country by the name of *cow-itch*, which is, I believe, a corruption of its proper name.

For worms, &c., my father found the following a very effectual remedy :—He took equal parts of fine, well-ground *chunam* and salt, and mixing them well together, used to sprinkle the mixture on the ground round the roots of the plants. Having done this, he used to water the plants immediately, which caused the powder to sink into the ground, and killed the worms. This was done in all his Belgachia plantations, where he kept country seedlings. The worms used to eat the roots, but this remedy stopped their ravages at once. This may also prove effectual in the case of white-ants.

If " A Florist " wishes to know more about manuring, I shall be glad to furnish him with further imformation.

HEM CHUNDRA DUTTA.

Rughoo Nath Chatterjee's street,
Malakar's Cottage, April 28, 1885.

Editorial Notes.

It was noticed in a recent article how prominently the Punjab Government's recent Resolution on the wheat trade brings out the increasing importance of Kurrachee as a centre of the grain export. The same fact is shown very clearly by the statistics of the trade returns. In 1882, Kurrachee exported about half as much wheat as Bengal, and only a quarter as much as was despatched from Bombay. In 1883, it sent out more than half as much as the Bengal export, and more than a third of Bombay's. In 1884, its exports exceeded those of Bengal by 50 per cent, and exceeded the moiety of those from Bombay.

⁂

The Madras Government, we are glad to find, have taken the initiative in abolishing a very inconvenient procedure observed in nearly all departments of Indian Agriculture. In a recent order issued by the Madras Government, it is pointed out that the continued disregard of the standing orders prohibiting the use of vernacular terms in English correspondence without an explanation of them, has attracted the attention of Government, and the Board of Revenue and other heads of departments have consequently been requested to issue fresh instructions to their subordinates prohibiting this practice.

It is stated that inconvenience is especially felt in regard to names of crops and trees, as totally different names are used to denote precisely the same thing in different districts, although in regard to trees there has been some improvement, botanical names now being frequently given. In furtherance of these orders, the Board of Revenue has been directed to draw up, in communication with the Director of Agriculture, a list of vernacular names of crops, with their botanical equivalents, for circulation to, and use by, Collectors and other officers in the Revenue Department.

⁂

The wisdom of these orders is obvious, as it is very often very puzzling to find out the crops or trees referred to, from the vernacular terms used. We should recommend the other provinces to follow in the footsteps of the Madras Government in this respect.

⁂

Continuing our review of Mr. Ozanne's report, we find that he has devoted much attention to the improvement of wheats. He says Bombay wheats are mostly hard, and have consequently not found their way into the English markets to any great extent. From experiments conducted by Messrs. McDougal Brothers, who have given much encouragement to this very important staple, it has been found that the hard white and hard red varieties are specially fitted for the English markets. We are glad to find that measures for improvement have been taken in hand by the Bombay Chamber of Commerce, which has suggested the distribution of prizes for the best farmed fields. To this end a conditional contribution of Rs. 1,000 has been made, together with a promise of help to procure good seed. The Government have accepted the offer, and have allotted Rs. 10,000 yearly towards measures of improvement.

⁂

Mr. Ozanne remarks, however, that the Chamber of Commerce has not been rightly informed regarding the admixture of hard and soft varieties of wheat which has been attributed to cultivators. He thinks that the theory of the so-called admixture is due to climatic influences, some evidence of which he pointed out last year in the pages of the *Indian Agriculturist.* He is, however, engaged in arranging for a thorough and systematic test on this very important point.

⁂

He strongly advocates the introduction of steam machinery for threshing and winnowing, and hopes are entertained of inducing Messrs. Balmer, Lawrie & Co., of this city, to set up one or two of their threshing machines next season. The experiment with the Cawnpore winnowers is said to have been disappointing.

⁂

In selecting the best variety of wheat for experiment, Mr. Ozanne's choice fell on the soft white variety of the Central Provinces with some other hard white and red varieties. Of these, seeds to the quantity of 180 maunds was distributed, which was calculated, to sow over 300 acres. He does not think the plan of giving prizes for the best farmed fields will be practically possible, and points out some of the difficulties in the way.

⁂

The export trade in wheat shows a falling off in the last year, 1884. Thus the figures for five years cited by Mr. Ozanne, give the following results ;—

			Tons.
1880	...	...	73,349
1881	...	...	263,729
1882	...	...	316,718
1883	...	...	370,873
1884	...	...	272,153

There is no positive reason assigned for this decrease, which may, in some measure, be ascribed to the unusually fine crop of wheat last season in England.

⁂

The experiments tried with the creeper known botanically as *Cryptostegia grandiflora*, which yields a juice capable of being worked into India rubber, proved that although it thrives well and is abundant in Poona and other places, yet it would not be profitable to make rubber from it.

⁂

A new departure in the crop and weather reports usually published in the *Gazette* is observable in the forecasts of wheat and cotton crops which Mr. Ozanne proposes in future to issue. These forecasts will be followed by harvest reports which will deal with the nature of the harvest, export demand, local prices, and quality of the year's produce. This is an innovation which will be looked upon with satisfaction by all interested in the subject.

⁂

We now come to a very important portion of Mr. Ozanne's report, *viz.*, Ensilage. Although while in England he was unable to visit any silos, yet he had heard and read enough to determine him to give a trial to the subject in this country The experiment was carried out in converting a large iron tank into a silo. The tank was cylindrical, and made of boiler plate-iron, its cubic contents being 7,000 cubic feet. The stuff put in was jowari (*sorghum vulgare*), black jowari or Chinese sugarcane (*sorghum saccharatum*), and bajri (*penicillaria spicata*). The area cut was 11½ acres, and the weight of the green stuff was estimated at 61 tons. The fodder was cut at the most favourable time, *i. e.*, just as it was coming into flower.

⁂

The crop was pitted whole, and took five days to fill in. The weighting averaged 200lb to the square foot. The temperature rose to 120 F. during the first three days after the silo was closed, and then fell to that of the outside air. About the same time a masonry silo was also filled. They were both filled in during September, and were opened in the January following. The iron silo however, was closed again, while the masonry one was kept open till June, by which time the ensilage was all consumed. The latter received 60,480lbs of very wet grass, and gave 49,486 lbs, or 82 per cent of ensilage, which was not a bad outturn.

⁂

The important feature in this experiment was, that no deterioration was observed in the quality of the ensilage during she time the silo was kept open. The upper layer was found mouldy, but lower down it was good in color, but " very hot and steaming." There was also found to be a " decided sour smell." This smell was strikingly perceptible in the iron silo. Indeed, Mr. Ozanne says it was so strong as to be " decidedly disagreeable.' The upper layers of about two inches were useless, but below, the colour is described as an excellent olive-green. The stocks of the Chinese sugar-cane tasted as sweet as when put in, which showed that the sugar had undergone no fermentation. This is considered an important point.

⁂

The feeding result of these experiments is not very encouraging. An elephant fed for 15 days showed a falling off of 5 inches round the fore arm ; but he is said to have consumed with avidity up to 400lbs per diem ! 12 mules fed on 42 and 30lbs respectively per diem showed a decided falling off in condition, although their general appearances was greatly improved in the matter of their coats looking very sleek. The last experiment on sheep and slaughter cattle also compares unfavourably. They lost in weight, and their offal showed evident signs of the effect of the forage. They were quite black. It would have been interesting to know the cause of the peculiar effect of the ensilage in this instance. Mr. Ozanne would have added much importance to his experiments, had he ascertained the cause of these apparently *contrary* effects of the ensilage on cattle. But as he adds that he has undertaken more searching experiments, we shall no doubt hear something more of this hereafter.

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The enquiries under crop diseases and blight show that nearly all our staples are affected by some kind of disease or other. Mr. Ozanne's remarks on the subject are thoroughly practical, and we have some hope that, in the not distant future, some remedies may be found to rid these crops of their pests.

UNDER "Improved Agricultural Implements," we find that steam power is taking the place of bullock power. A sugar-cane mill is referred to which is obtainable at a cost of Rs. 200. It is plain that the sugar-cane mill in use in the Madras Presidency (which is referred to in another column) is not known in the Bombay Presidency. It has given such extensive satisfaction to the ryots and cultivators of sugar-cane, that we cannot help expressing some surprise that it finds no place in Mr. Ozanne's very able report.

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UNDER "Cattle-breeding and Veterinary Establishment," we are told that much valuable information has been collected regarding the various breeds of cattle, which is, however, not given. A Veterinary Hospital and College under the educational Department has been sanctioned, together with a hospital for practice in connection with the Veterinary course at the College of Science, Agricultural Branch, under the Professor of Veterinary Science.

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AGRICULTURAL and fiscal statistics, together with trade and trade statistics, have not been taken up for reasons given. Mr. Ozanne describes his report as "incomplete and sketchy," which is owing to the early date on which it was required to be out. We find, however, that a definite plan has been laid down, which is calculated to meet the end in view in future reports.

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WE cannot close this review without expressing our satisfaction with the thoroughly practical and interesting character of this report. As a first attempt, Mr. Ozanne has, in this particular direction, displayed a thorough ability to grapple with the multifarious subjects which come under his supervision. But in connection with such reports, we would invite Mr. Ozanne's attention to the report of the Department of Agriculture, Washington, which we have just received through the courtesy of G. B. Loring, Esq., the Commissioner of Agriculture, Washington. In a future issue we shall notice the character of this report.

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THE methylation of spirits has occupied the attention of the Madras Government, it having been represented by the Commissioner of Salt and Abkari Revenue that the standing orders of the Board of Revenue, Madras, issued on the subject, have been found to be deficient, inasmuch as they do not provide whether the spirits to be methylated are to be of, or above, any fixed strength, or that the ingredients to be used for methylation shall be submitted to prior examination and approval by any competent person.

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WITH reference to the first point, Mr. H. W. Bliss, the Commissioner, observes that the Calcuttta Sea Customs rules lay down that no spirit of less strength than 30° over proof shall be methylated, while in England the required strength is not less than 50° over proof; and that the object no doubt is that the two substances to be mixed shall be as nearly as possible of the same specific gravity. While in regard to the second point, the standing order lays down that samples of the pyroxylic spirit or other ingredients used in the methylation of spirits, shall be retained by the guager for testing the adulterant produced by importers, while in another standing order, there is only a general provision that 10 per cent of pyroxylic spirit, or such other ingredient as might be approved by the Chemical Examiner, shall be used.

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MR. BLISS does not think that even the former provisions are adequate, as no testing by a guager would be of any use unless he had some chemical knowledge, and possessed the necessary appliances. He has therefore suggested the amendment of the standing orders so as to provide that no spirits of less than 30° over proof be methylated; and that the pyroxylic spirit or other ingredient used in methylation, should, in the first instance, be sent to the Chemical Examiner, and after approval by him, be secured and kept in the custody of the guager until required for use. He added that a similar provision exists in the Calcutta rules issued under Section 155 of Act VIII. of 1878.

THE Madras Government have approved the proposal made by Mr. Bliss, and recommended to the Government of India that rules in force in Calcutta on this subject may be extended to Madras, and the Government of India have sanctioned the recommendation.

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THE agricultural statistics of Ireland bring to light some very interesting facts, not generally known. Thus we find that wheat cultivation shows a decided falling off. The area under wheat has decreased almost 30 per cent in one year. The area of the wheat crop during the nine years, from 1874 to 1882, is stated to have been on the average 150,000 acres, while in 1874, it had reached 189,000 acres. Since 1883 it has continued to decrease; thus in 1883, it had got down to 95,000 acres, which decreased further in the following year to 68,000. The cause of this steady falling off cannot be ascribed to any fault of the Irish farmers, as the outturn per acre has been maintained at an average of 14½ cwts., or 1,600 lb., which is a rate of produce about 50 per cent greater than that estimated for Indian wheat.

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BARLEY seems to be much more widely grown in Ireland than wheat. During the years 1874 to 1881, the acreage averaged 220,000, which in 1882, however, fell to 187,000, and in 1884 to 167,000 acres. The most curious part of these statistics is that the so-called national staple-food of Ireland, potatoes, is not by any means the most widely grown crop in Ireland. Oats, which form the largest crop in Scotland, take the foremost place in Ireland also. Strange that the food of horses in England should form the largest item of man's food, both in Ireland and Scotland! but the fact is beyond doubt; for the acreage under oats covered no less than 1,480,000 acres in 1874, and 1,348,000 in 1884, which is far above that of barley and wheat.

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POTATOES occupy only the limited space of 800,000 acres. We say "limited" advisedly, when compared with the acreage under oats. But it must be admitted that an acre of potatoes in Ireland produces a little more than 3 tons, which is nearly three times the average of an Indian crop of this tuber. The quality of the Indian potato cannot compare with anything like respectability with the Irish production.

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NEXT in extent to potatoes, comes the turnip cultivation, which covered something like 339,000 acres in 1874, and 304,000 acres in 1884; thus showing a decided decrease, which commenced six years back. Flax is largely cultivated also, but it is confined almost entirely to Ulster; but the linen business has suffered somewhat from the dormant state of the trade The cultivation of flax has steadily decreased from 157,000 acres in 1880, to 89,000 in 1884.

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IT is clear that the figures given above show a decided falling off in every respect. The only crops which have maintained anything like a normal average during the past five years, are oats and potatoes, which form by far the largest proportion of the food of the poorest classes. The cheap foreign supply of wheat in late years, both in Ireland and England, has led to the abandonment of this crop in a marked degree. Apart, however, from this, the general decrease in area under crops of all kinds, brought to light by these statistics, discloses a very serious condition of things; while the extreme poverty of the West of Ireland is painfully manifest. The causes that have brought about such a state of affairs are too well known to require any remarks here.

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MR. C. BENSON, Agricultural Reporter to the Government of Madras, in a letter which he has recently addressed to the Director of Revenue Settlement and Agriculture, makes the following remarks regarding the Rajahmundry Show, held on the 5th, 6th, and 7th April 1885:—"The show was practically the first of its sort, although last year an exhibition of garden produce was got up. It was confined to the stock and produce of the Northern Circars. The show of the former was, as might be expected, a poor one, as compared with what might be got together in other parts of the Presidency, the only cattle of special merit being of the Nellore breed. One or two fair pony stallions were exhibited, but the sheep were few in numbers, and of very inferior quality. This, however, must not be taken as discouraging, as the main object of such shows is, I take it, to get together the best produce of the locality in which they are held. As a first attempt of private enterprise, even in this respect the show attained a fair degree of success. In future years if the Show is continued, the Committee will doubtless be able to do much more, and if aided, as I think they should be, by Government liberally, be able to frame a more attractive prize list, and so draw exhibits from a larger circle.

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As regards the produce exhibited, I must observe that, as regards paddy, I was disappointed. Some very good samples of yellow cholum were shown and the cumbu was fair. In the pulses the exhibits were generally fair and clean samples. The oil-seeds were good ; but few in number. The fibres revealed nothing new, nor were they well prepared. Some of the sugar-cane shown was very good, but the tobacco was scarcely ready for exhibition. Of oils, oil-cakes, and sugar or jaggery, the exhibition was very meagre. Regarding horticultural produce, I do not feel called upon to speak, especially as a good deal of the show in this respect consisted of European plants and vegetables. No prizes were offered for implements or machines, but Messrs. Massey and Co. sent up a few ploughs, and I expected that Messrs. Oakes and Co. would have done the same. Messrs. Bancroft sent the Hindustan plough. To supplement these intended exhibits, I sent up a few implements and two machines for display. One of the latter was injured in transit, but the other, a winnowing machine, attracted a good deal of attention. I sent up from Saidapet a set of samples of grains, cotton, oil-seed, &c., and of some fibres not usually made use of. On the 7th morning, a ploughing demonstration was held. I had no notice of this before I came up, and, although thinking one might possibly be held, I considered that, as a number of men from this district had been trained at Saidapet to plough, the revenue authorities would have provided competent ploughmen. None were, however, available. The demonstration was therefore held under unfavorable circumstances, especially as the time of year was also unsuitable, all ordinary arable land being unploughable. Notwithstanding this, what ploughs of Messrs. Massey's were on the ground were sold and orders booked for more. Altogether the show was satisfactory, although it might have been far better, and it is questionable whether it would not be well to devote a part of the annual grant for exhibition to the development of this show, and to endeavour to make it generally representative of the Northern Circars, and more general in its scope."

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We quote below an extract from the notes of Messrs. McDougal Brothers, of London, on Indian wheats, dated the 15th March 1882, which forcibly shows the great superiority of Indian wheat over others. " In addition to the particulars contained in the foregoing returns, we have to report that to any one experienced in the requirements of the wheat and flour markets of the United Kingdom, and, indeed, of most other countries, it will be evident there is no probability of these Indian wheats coming into demand for manufacture into flour, *without a liberal admixture* of other wheats. They all possess, in a marked degree, the same characteristics of great dryness and a distinct beany and almost aromatic flavour, inseparable from wheats grown in the climates and soil of the tropics. Also the flours are ricey, the texture of the breads is too close, and the crust is hard and brittle. But these characteristics do not detract from their usefulness in any important degree. As is well-known, a miller cannot show skill in his craft to greater advantage or profit than that with which he selects his wheats, and mixes his grists so as to produce to best advantage a flour from which bread can be made of the colour, bloom, strength, and flavour desired, and withal a good yield. We pronounced them to be exceedingly useful wheats : in fact, hardly equalled for what is deficient and wanting in the English markets by any other wheats.

Their chief characteristics are just those in which the wheats grown in our variable climate are most deficient. Their great dryness and soundness renders them invaluable for admixture with English wheats that are in any degree out of condition through moisture, and the great proportion of the wheats harvested here have been in that condition for some years past—a condition that must prevail in all other than wheats harvested and stored during fine and favourable weather ; and this the English farmer knows greatly to his cost, is a state of climate that is by a long way the exception rather than the rule. Added to their dryness, the thinness of the skins of these wheats and consequent greatness of the yield of flour must always place them in the front rank as a "miller's" wheat, whenever they are handled with reasonable intelligence and skill. Such unprecedented yields of flour, as are shown by these wheats, ranging (by ordinary grinding) from 77·46 to 80·52 per cent against English 65·2 and American spring 72·2, speaks volumes in their favour ; and their value is still further increased by another point of merit of almost equal importance, *viz.*, a larger percentage of bread may be obtained than from any other of the flours included in this review. That for the best of these Indian wheats (the fine soft white), on the day they were valued in Mark-lane Market, a price was offered as high as that for American winters, New Zealand or English (see list of values in synopsis), proves that the great value of the Indian wheat is becoming recognised here—a knowledge that will ere long extend to all our markets. The other lots of Indian wheats (Nos. 2, 3, and 4) were lower in value to the extent of four to five shillings per quarter, as might almost have been expected from the difference in colour and other characteristics : still, as these latter wheats become better known here, this difference in price will be somewhat lessened. Their beany flavour is not a serious obstacle, as fair average deliveries when well cleaned and properly dealt with can be employed in the proportion of 25 per cent to 50 per cent along with home grown or other wheats, such as American, possessing a fine, sweet, milky, or nutty flavour.

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" *Glancing at all the facts here elaborated, it is evident that these wheats afford a larger margin of profit, both to the miller and baker, than any other.*

"We venture to record a conviction we have long held, strongly emphasized by the results of these experimental workings, of the measureless importance of the great resources of the Indian Empire being developed to the utmost in producing wheat for this country. Farmers here are finding that to live they must produce beef and mutton rather than grain : hence the greater need of resources of supply under our own control."

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A correspondent writes :—"The heat at Bangalore is phenomenal, and the folks at this favourite station are beginning to wonder what it all means. The good old-fashioned Bangalore climate has given place to a kind of qualified Bellary. Truly they managed these things better in the days of the Mysore Commission ! As to water, that is a sore subject. Well after well dries up, and the cartmen have to go further and further to fill their barrels. Grass has long since disappeared. The Cubbon Park is the colour of an underdone chatty. The beautiful Lal Bagh itself is as dry as a cinder. In this last named once popular resort both *fauna* and *flora* look equally miserable. The antelope and sambur are tamer and sadder than ever, and the big cats in their dens are too exhausted to prowl up and down. Poor cats ! How they must long for the jungle, with its cool earthy lairs, and leafy shade. If one ever could pity a tiger, that incarnation of cruelty, these are to be pitied "

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A curious story comes to hand from Mysore. It appears that the *jaghirdars* of a large *jaghi-* village named Hokas in the Vanhas taluq of the Phansi sub-division, are far from satisfied with the terms on which they hold their lands from Government. Accordingly on April 1st, they held a meeting and elected a *Panch*, who were to consider the advisability of petitioning Government for the reduction of their *judi*. The meeting was attended with some excitement, which was increased by the untimely appearance of Mr. Narsing Rao, the district officer. He seems to have acted rather unwisely in threatening immediately to attack all the *jaghait*

land of the *jaghirdars* (which is in arrears), and to drive them entirely to the *varkas.* This threat so incensed the *jaghirdars* that they drove Mr. Narsing Rao from the meeting, and pursued him through the village, waving their *takshims* and shouting fiercely. The unfortunate refugee found shelter in the house of a Mr. Sarendro Nath, who very properly refused to give him up, and who eventually prevailed upon the angry villagers to disperse. Mr. Narsing Rao then left the village after a detention of three hours. The matter is being strictly enquired into by order of Government, since this is not the first time that an affair of the sort has taken place in the district. It is just as well that the affair should have taken place upon the first of April.

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In the Central Provinces, notwithstanding the injury done by rust in the northern districts, the prospects of the crop are still excellent. The area said to be under wheat (370,000 acres) is less than the reputed normal wheat area by about 200,000 acres, but the outturn is expected to be 817,857 tons or 14,286 tons above the average. The export during March was about 14,282 tons, but that for the first week in April amounted to 5,357 tons. In the Bombay Presidency and in the Berar, prospects remained unchanged at the date of the report. No fresh information has been received from any of the native States.

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The *Times Democrat,* in describing the various exhibits in the World's Exposition at New Orleans, mentions a decorticating machine. The description given of it will, we think, interest many of our readers. The *Democrat* says of it :—" The machine is entitled the Universal Fibre Decorticator, which is manufactured by the Remington Agricultural Company, and was invented by Mr. T. Albee Smith, of Missouri. During the past month this decorticator has at times given displays of its qualities before numerous spectators, but on Thursday last it fairly astonished the seekers after fibre-preparing machines who were so fortunate as to witness its performances. The enterprising agent of the Remingtons, Major F. F. Hilder, anxious to test the capacity of the decorticator, had procured from British Honduras a quantity of *Bromedia sylvestras,* or silk grass leaves, banana and plantain stalks, and henequin or sisal hemp leaves.

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It was generally known that the decorticator would be tested at 2 P. M., and quite a large crowd of experts was assembled, who were desirous of seeing it operate on green leaves. At length Mr. Smith placed several henequin leaves on the platform of the machine, which was set in motion, and in a few seconds the fibre was perfectly cleaned, without any perceptible waste. The silk grass leaves and plantain and banana stalks were also operated with the same result. Kentucky hemp (both rotted and in an unrotted condition) was thoroughly divested of its woody parts in one single and simple operation. The machine thus proved to the complete satisfaction of all who saw it work that it is, as it claims to be, a genuine universal decorticator. Mr. Albee Smith, the inventor, expects to procure green ramie stalks before the Exposition closes ; and will demonstrate to the public the ability of the machine to prepare ramie for market in one operation. Green jute stalks may not be obtained in time to enable the machine to show its ability to clean that fibre also As the product of dried jute stalks is only fit for paper-making, Mr. Smith does not care to bother with it. The universal decorticator, therefore, claims to successfully operate all green fibre plants, whether leaves or stalks. As fibre extracted from stalks contains more or less resinous gum, it must go through another process after it is decorticated to secure complete disintegration. Mr. Smith asserts that the jute fibre decorticated by his machine, after being steeped in water for a week, becomes thoroughly disintegrated, and is fit for market. The display made on Thursday proves conclusively that Mr. Smith's machine can successfully decorticate green fibrous plants. It is the only machine on exhibition that has attempted to work green material. Persons desiring further information regarding this decorticator can obtain it by addressing Major F. F. Hilder at the Remington exhibit in the Main Building, or at his office, 29, Poydras-street, this city.

That horrible vine-pest, the phylloxera vestactrix, has again been giving trouble in Australia. It appears that they have not yet done it with there. Some years ago the Parliament of South Australia agreed to contribute one-third of the expenses incurred by the Victorian Government in up-rooting the vines at Geelong, in which the phylloxera had made its appearance. The vinegrowers and the colony generally had reason to complain of the conduct of the sister colony in the matter. Instead of going to work with the energy required, Victoria remained shilly-shallying, and it was only as the result of repeated requests that she at last fulfilled her part of the bargain. The existence of the phylloxera in Geelong vines has been found to be a serious danger to South Australian vineyards, and experts agree that a policy of extermination is the only way of getting rid of the evil. It is stated that an experienced vinegrower who visited Geelong a couple of years ago found that this evil was still in existence. We are told that, roused partly by his representations, those interested in the same industry in Victoria put forth all their efforts to induce the Government to fulfil their promise. In this the Government was not entirely successful, and the phylloxera has not yet been eradicated.

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This fact gives particular importance to the announcement that a strong movement is being made for the removal of the restriction on re-planting the Geelong vineyards. If it is true—and we see no reason to doubt the truth of the statement, made as it is by an authority on such matters—that suckers from some of the vines which had been cut down have sprung up with the phylloxera in them, the Victorian Government would be acting most unjustly if they removed the restriction. The colony is described as being interested strongly in the matter. It has contributed part of the money required, and the spread of the ravages of the phylloxera is looked upon as little less than a national calamity.

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In connection with this subject, the following telegram appears in the South Australian Register :—"Mr. Bosisto, M.L.A., chemist, has, at the request of the Minister of Agriculture, reported upon the proposed mercurial remedy of Mr. J. A. Baner for phylloxera. Mr. Bosisto says the remedy would, in his opinion, prove most expensive and turn out worthless. The Minister of Agriculture has, in accordance with his promise to a deputation of vinegrowers from Geelong, appointed a Board to enquire into the whole question of the advisability of replanting the vines in Geelong district. The Board will consist of Messrs. Harris and Bosisto, M.L.A's., L. L. Smith, and two gentlemen nominated respectively by the Melbourne and Geelong Vinegrowers' Association. The Geelong district will be visited and carefully inspected, and the fullest enquiries will be made with a view of ascertaining whether the replanting of vines may be permitted without running serious risk of promoting another outbreak of phylloxera. The colonies of New South Wales and South Australia, which contributed towards the expense of eradicating phylloxera in the Geelong district, are deeply interested in the question, and it is recognised by our Government that their wishes must be consulted in the matter before any important step is taken."

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A contemporary, writing of the American rice trade with England, says :—" America, long ago, ceased to export domestic rice in any quantities ; and that of late years considerable of our snpplies have been drawn from abroad, particularly low grades used for distilling and other kindred purposes. At one time Carolina rice was a feature in all English grocery stores, but the civil war completely ruined the trade. Its place has been taken up by Java and Japan rice, which sells at from 4½c. per pound. British India produces the bulk of the rice, which is known to the trade as Aracan and Rangoon. It sells in the London market cleaned ready for domestic use at from 2c. to 2½c. A cargo of uncleaned rice was recently sold in London at 6s. per cwt., or 1½c. per pound. This is the lowest price on record. There is a heavy duty on the rice imported into America. It is not generally known that rice forms the staple food of the greater part of the population of the world. In

British Burmah alone, the area under rice cultivation, the present season is 3,144,884 acres, an increase of 69,500 acres over last. The crop prospects are satisfactory, according to latest advices."

BEHEEA SUGAR MILLS.

The Madras Government have, for the past two years, been engaged in conducting experiments with the Beheea Sugar Mills, patented by Messrs. Thomson and Mylne. Mr. W. Wilson, the Director of Revenue Settlement and Agriculture, Madras, to whom was entrusted the task of carrying out the experiments, has reported at some length on the result of his efforts to spread the use of this mill among the ryots.

It appears that in January 1883, the Collector of North Arcot asked the Board of Revenue to let him have one of these mills for exhibition in his district, wherein sugar was largely grown; and that, in compliance with his request, one of the old two-roller mills, that had been used in experiments at Bellary, was placed at his disposal. In May 1883, this officer reported that the mill was no longer required in North Arcot. Whether he had been successful or not in his efforts, is not known, as, from the correspondence before us, we are entirely in the dark.

Then it seems the Collector of Coimbatore expressed a desire to have the mill tried in his district, and it was accordingly sent to him. But here the results of the experiments were decidedly unsatisfactory, and contrary to the experience of all those reported from Bellary and Northern India. This appears to us to be passing strange; but the cause may be attributed, as Mr. Wilson says, to the fact of trundling about a solitary specimen of the mill from district to district, which, not to speak of the expense, was a slow and unsatisfactory way of bringing the mill to general notice. Whereupon, in October 1883, a letter was addressed to the patentees, suggesting that it would be to their advantage to take measures for the exhibition on their own account of their new-pattern three-roller mills in the sugar districts of the Madras Presidency, a list of which was furnished to them.

This suggestion was willingly responded to by the patentees, who explained at the same time that they had for some years been endeavouring to push their business in Madras, and had that year established a local agency at Madras, while in the previous year they had sold a good number of their mills in the Godaveri district, at the head quarters of which (Coconada), they had also established an agency for the manufacture and sale of them, and where there were already 41 of them at work. Another encouraging feature in the more extensive use of these mills, which have been highly spoken of in many parts of Northern India, is that, on the application of the Collectors of Ganjam, Vizagapatam, Bellary, Cuddapa, South Arcot, Salem, Madura, and South Canara, Messrs. Thomson and Mylne have forwarded, at their own expense, mills for exhibition in those districts. Mr. Wilson says, that he has had no information as to the total number of mills sold from the first beginning of the enterprise up to September last; but from a return furnished to him by Messrs. Oakes & Co., the local agents at Madras, it appears that they had succeeded in selling 81 mills in the first eight months of 1884. Of this number, no less than seventy-five went to the Hospet taluk alone. There seems, no doubt, therefore, that the ryots have taken kindly to the new mills, and that their sale is extending.

A letter addressed by the agents of Messrs. Thomson and Mylne at Coconada, discloses the fact that the mill is in high favour with the cultivators of sugar-cane in the Godaveri district. The agents say that they succeeded in selling, from December 1883 to March 1884, no less than 169 mills, "from their having been brought within the reach of ryots of ordinary circumstances." This fact speaks volumes in its favour. The following figures show the number of mills at work in the Godaveri district since they were first introduced there :—

In the Season of	1882-83 ...	...	... 48 mills.
Ditto	1883-84 ...	...	... 169 „
Ditto	1884-85 ...	...	... 260 „

It is stated that their sales have been recently affected by the decline in the price of sugar, and the consequent contraction of the sugar-cane area.

From the foregoing, we conclude that the Beheea sugar mill, as manufactured by Messrs. Thomson and Mylne, is a portable machine, easily worked, simple in its construction, and what is most important, "within the reach of ryots of ordinary circumstances." With these qualities to recommend it, the mill ought to take a prominent place amongst agricultural implements. In Bengal, Behar, Oudh, and the N.-W. P., where the sugar-cane is extensively cultivated, the ryots cannot do better than follow in the steps of their Godaveri contemporaries. But in connection with this subject, we cannot close our remarks without observing that unless the district officers of these provinces emulate the example of the Madras Collectors, in prominently bringing the mill to the notice of sugar-cane cultivators, there can be little hope of these poor ignorant people becoming acquainted with its good qualities. The sugar industry in India is assuming such importance at the present time, from the fact of having a powerful rival in the beet sugar of France and Germany, and the Straits, that any improvement on the primitive methods of extracting the juice of the cane, will go far towards lessening the price of labour in its manufacture, thus rendering it proof against the encroachments of the beet.

GAMBOGE.

Mr. R. A. Mack, writing on the 22nd ultimo on the subject of the gamboge of Burmah, says that although various varieties of gamboge-bearing trees have for many years past been known to exist in different parts of the province, notably in the Tenasserim division, it was not until comparatively recently that the subject was brought specially under the notice of the local Government. Writing more than thirty years ago, Mr. Simmonds, in his work, entitled *Commercial Products of the Vegetable Kingdom*, says: "The *Garcinia elliptica* of Tavoy and Moulmein affords gamboge and approaches very closely in its character to Graham's *Hebrodendron*;" and he adds that it affords "a fine pigment." Dr. Mason also, in his work on Burmah, remarks that "the best gamboge is produced by *Garcinia elliptica*, but an inferior article is produced by *G. cornea*, *G. anomala*, *G. cowa*, *G. kydia*, *G. succifolia*, *G. xanthochymus*, and *G.* (*Hebrodendron*) *morella*. *Garcinia Gambogia* yields a pleasant fruit and a gamboge quite insoluble in water, and it is the complete solubility of the best gamboge that distinguishes it from inferior sorts, but it is probable that, when fully investigated, these insoluble gamboges will be found of service in the arts."

In 1875 Mr. Whittall, of the Forest Department, drew attention to three different species of trees, belonging to the genus *Garcinia*, growing in the districts of Southern Tenasserim. These were known to the natives as *Tawmengoot*, *Parawah*, and *Parajay*. The two last named Mr. Whittall did not consider of much account. The *Parawah* yields an exudation of a white colour, which changes to a reddish yellow on exposure to the atmosphere, and is scarcely at all soluble in water, but yields to alcohol. The *Parajay* yields a rather copious exudation which, when dissolved in spirits of turpentine, affords a beautiful, permanent, yellow varnish for metallic surfaces, and on this account has been called the gamboge tree as well as the yellow-varnish tree: but its exudation does not form an emulsion with water, and, for this and other reasons, Mr. Whittall considered it had no claim to be considered a real gamboge tree. The *Tawmengoot* was, in Mr. Whittall's opinion, the gamboge tree of the South Tenasserim forests. He says: "the gum resin is larger in quantity and darker and of more glossy colour than the others: neither wet nor dry is it so sticky, and so readily does it form an emulsion with water that the exudation on the outer bark is completely washed away by the rains." This tree he believed to be the same as that which Dr. Mason calls *Thanataw* (*Garcinia elliptica*) [*G. heterandra*], and he adds that it was supposed to be the same as that which yields the gum resin exported from Siam. But Mr. Hill, Officiating Conservator of Forests, Pegu Circle, thinks the

Tawmengoot is probably the *G. Morella* or *pictura*, or *gutta*, the true gamboge tree, which does not grow all over Burmah like *G. elliptica* or *G. cowa* which latter are common trees throughout the province.

In May 1884 the Commissioner of Tenasserim drew the attention of District Officers to the trees called *Thaungthaleh* (*G. kydia*) and *Thanataw* (*G. elliptica*) found growing in the tropical forests of Martaban and Tenasserim with the view, if possible, of developing a new industry for the people. Of the former Mr. Hill says: "It yields a yellow substance of a bright colour, but paler than the gamboge of Siam. It is scarcely soluble in water, but dissolves in spirits of turpentine, and affords a beautiful, permanent, yellow varnish for metallic surfaces. As the substance is very resinous and will not dissolve in water, it is valueless as a pigment." Of the latter he remarks: "The product known as *Thanataw* is obtained from *G. elliptica* or *heterandra*. It is called a superior gamboge, but in all probability merits the name almost as little as *Taungthaleh*, owing to its only partial solubility in water. It is found throughout the province, and is darker in colour than *Tawngthaleh*. A sample of *Thanataw* obtained from Tavoy was found upon analysis to contain.—

Resin	76·5
Gum	23·5

This sample was sent to Calcutta for valuation, where it was declared to be gamboge, but unsaleable in an unrefined state. In August of the same year samples of gum produced from two other kinds of trees called *Palagyi* and *Tawmengoot* were also obtained and submitted for analysis. They were found to contain—

	Palagyi.	*Tawmengoot.*
Resin	58·82	53·20
Gum	9·54	20·30
Water	32·66	25·60

In his report on these samples Dr. Romanis, the Chemical Examiner, says the yellow kind (*Tawmengoot*) makes a very fair paint, but the other is of no use. If the gum is extracted, it makes a spirit varnish, but when warm it melts and gets sticky.

According to the broker's report, to whom the sample of *Thanataw* referred to above was submitted for valuation, gamboge in its refined state sells in the Calcutta market at from Rs. 2 to Rs. 2-8-0 per seer. It arrives there freely from June to August, usually packed in cases of from three to four maunds, and it is chiefly used in French polish and paint. In Burmah the cost of collection alone is estimated by the Deputy Commissioner, Tavoy, at Rs. 25 per viss (3-65lbs). That is to say, the cost of collection amount to nearly Rs. 7 per lb., while the market value of the product is only Rs. 1-4-0 per lb. and that too when it is in a refined state. It does not appear why the cost of collection is so great. In Ceylon the process of collection is very simple. There the gamboge is usually collected by cutting a thin slice of the bark of the tree here and there of the size of the palm of the hand. On the flat space thus exposed the gum collects and is scraped off when sufficiently dried. It may be possible perhaps to reduce the cost of collection. Unless it can be reduced very considerably, we cannot hope to introduce the Burmah product into the market. From the enquiries made, then, it would appear that the *Tawmengoot* alone yields good gamboge, and that the only obstacle in the way of the gamboge succeeding as a commercial product is the high cost of collecting it. The products of the other trees mentioned are not promising because of their comparative insolubility in water.

AGRICULTURAL DEPARTMENT OF BENGAL.

ONE of the most important results of the late Famine Commission has been the establishment of Agricultural Departments in the several provinces in India. By a strange and unaccountable omission, however, Bengal has hitherto remained without a separate department, till the subject was taken up by the present Lieutenant-Governor who, in June 1883, sent in a proposal for the consideration of the Government of India, based on the recommendations of the Famine Commissioners, as approved by the Secretary of State, and which may be broadly summed up as follows:—

1. The collection and embodiment in convenient forms of statistics of vital, agricultural, and economic facts.

2. The general improvement of Indian agriculture, with a view to increasing the food-supply and general resources of the people.

3. The organization of famine relief.

The Lieutenant-Governor's proposal fell under two heads—Agricultural Research and Agricultural Improvements. Under the former head, Sir Rivers Thompson's recommendations embraced the necessity of providing a local agency for the ascertainment of agricultural facts, and for the maintenance of the village records of rights, without which it would be impossible, he said, to acquire in a continuous and methodical way, any trustworthy statistical information in Bengal, owing to the absence of proper agency for the purpose. In regard to the question of *Agricultural Improvements*, the Lieutenant-Governor had indicated the duties which would devolve on the Agricultural Department in dealing with that question, and also in promoting the more enlightened administration in Government and Court of Wards estates. On all these points, the local Government received the general support of the Government of India, embodied in a despatch to the Secretary of State. Lord Kimberley, while admitting the beneficial effects of a general field survey of Bengal, and the establishment of a system of detailed village records, was unable to sanction an undertaking of such magnitude until he had been put in possession of facts in connection with the methods to be adopted in carrying it into execution, the expenditure likely to be incurred, and the difficulties that would have to be met. But at the same time, he admitted the "importance of providing the Lieutenant-Governor with the requisite agency for advising the Government generally in all matters relating to agriculture and statistics, as well as for undertaking the preliminary enquiries which the Lieutenant-Governor may consider necessary in connection with experimental field survey in the Patna division, and the enquiries mentioned in connection with the creation of a village agency of account in Government and Wards estates." His lordship also observed that "in the absence of these means of obtaining a satisfactory knowledge of the agricultural statistics of Bengal, which are supplied by the revenue organization of other Provinces, it is all the more desirable that every effect should be made to supply this essential requisite of good government." In accordance with their resolution, the Government of India sanctioned the appointment for two years of a special officer to advise the Lieutenant-Governor, in matters, relating to agricultre and statistics, to undertake the preliminaries in connection with the experimental field survey of the Patna division which has been sanctioned by the Secretary of State, and to assist in obtaining the detailed information called for by the Secretary of State in regard to the creation of a local agency of record in Wards' and Government estates. Under these conditions, the Agricultural Department of Bengal has come into existence as a tentative measure, and a special officer, styled the Director of Agriculture, has been appointed. His attention will be directed to both agricultural research and agricultural improvement. In regard to the former, he will have to address himself to carry out the experimental survey, under chapter X of the Tenancy Bill, by professional agency, particulars of which are given in the Resolution. Before finally determining the method of preparing the record of rights, and the system of local agency to maintain them when completed, the Director will ascertain by personal inspection what is the most approved practice in the North-West Provinces where the same work is in progress now, and report upon it. Another matter with which he shall have to deal is the question of the market prices of staple food crops; and it will be one of his first duties to enquire into the existing machinery for ascertaining and recording prices, to frame proposals for its amendment where this is found to be necessary, and generally to set on foot, under the directions of the Board of Revenue, arrangements in accordance with the provisions of the law for the systematic and continuous record, verification, and publication of the prices-current of staple food crops.

Miscellaneous Items

Glanders has broken out amongst transport donkeys at Mecan Meer.

The Viceroy opens the Ripon Hospital at Simla on Thursday afternoon the 14th instant.

A Silk manufactory is to be established in Riukin, Japan, to afford employment for the poorer class of *shizoku.*

The Soldiers' Exhibition, which was to have been held at Bangalore in October next, has been postponed.

During the month of March, 120,978 bales of cotton, valued at Rs. 1,13,50,243, were shipped from Bombay.

The Madras Municipality have farmed the lotus leaves and flowers growing in the People's and Napier Parks to a contractor.

Mr. J. W. P. Muir-Mackenzie, Forest Settlement and Demarcation Officer, Sattara, is allowed furlough for thirty months from the 23rd May.

The latest official census of Japan reports a total population of 37,442,966, of whom 18,492,807 are females. The number of houses in the country is 7,674,224.

The Madras Government have sanctioned the sum of Rs. 850, asked for by the Superintendent, for the examination and protection of the pearl banks near Tuticorin.

It is stated that the French are about to form at Hanoi an Agricultural and Industrial Association, the object of which is the development of the resources of Tonquin.

The shipments of new season's tea from Canton to London, up to the 14th of April, were 30,925 lbs. At the same date last season the shipments had amounted to 395,011 lbs.

A society of *shizoku* in Ragoshima, Japan, proposes to engage in the breeding of silk-worms on a large scale, and a Government grant of 100,000 *yen*, in aid of the enterprise, is expected.

The loss to the British trade, says an Italian journal, since the commencement of the Franco China war, amounts to an average of £2,000,000 per month or £24,000,000 per annum.

The S. S. *Clan Matheson*, which arrived in the Madras roads lately from London, has brought 3,300 cast iron railway plate sleepers and 6,700 packages of telegraph stores.

An exhibition of articles connected with the silk and porcelain industries will be opened at Uyeno, Tokiyo, Japan, on the 1st of March, under the auspices of his Excellency Count Matsugata.

The subscription raised in Saigon for the relief of the sufferers by the recent inundation in Pondichery and Karikal amounted to $1,020. This amount has been remitted to the Governor of Pondichery.

A huge drum, nearly eight feet in diameter, anciently used for religious ceremonies at the Imperial Court in Kiyeto, is to be sent from Japan to the impending exhibition of musical instruments in London.

The attendance at the Mogalbhin Fair, which lasted from the 14th to the 16th March, is said to have been about 3,000, and the estimated value of property which was sold on the occasion was Rs. 3,000.

The Government of Madras has consented to grant advances to certain sufferers from the breaching of the Red Hills tank, for the purchase of cattle and seed-grain, free of interest, to be repaid by fixed instalments in four years.

A Circular has issued from the Financial Department, warning all departments to economise and cut down expenditure in every direction—a necessary corollary of the sudden strain upon the finances of India for warlike preparations.

At this season, large quantities of mangoes, in all stages of maturity from the small green fruit (*khairi*) to the large ripe, deep-tinted *pairi*, were usually to be seen all over the place. (Bangalore.) But this year, with the exception of a few small green mangoes, none can be had.

The Oossoor Remount Depôt has been drained of all its horses to supply Cavalry and Artillery requisitions of the Army Corps at Quetta. The other day a special train was timed to leave Malloor, with a large batch of horses from Oossoor for Bombay, *en route* to Quetta.

The *Penang Gazette* regrets to learn that owing to the depression in the Sugar market throughout the world it has been decided by one of the largest European Sugar Companies to at once close one of its estates in Province Wellesley; and we understand further that, according to information just to hand from London, a resolution has been come to, to the effect that, if no improvement takes place in the market soon, all the other estates of the Company will be also wound up.

Since the transfer of Mr. Sanderson to Dakka, wild elephants in parts of Maisur are said to have increased to such an extent that the duties of the dak runners and the Forest officers cannot be performed in the Kadur district, whilst in other parts the intercourse of the inhabitants of almost adjacent villages has been put a stop to.

Rather an unusual occurrence was witnessed lately at the village of Nandosee, Havili Taluka, when a field of dry grass caught fire and blazed away for hours, extending over something like a hundred acres. The simple villagers were unable to cope with the fire, which died away as spontaneously as it seems to have sprung up.

A Lahore correspondent writes that the Cashmere Durbar, in pursuance of their policy of opposition to the extension of trade, have made an unwarranted attack on Mr. Russell who had formed a new trading company under the patronage of Sir Oliver St. John. The matter has been represented to the Viceroy, and will probably result in heavy litigation.

It will be news to the Bengal Chamber of Commerce to hear that it "cordially approved" of the recent proposal to establish a value-payable post with England. This is the case, however, according to the leading Madras paper, which claims for the Madras Chamber the exclusive credit of having brought about the decision of the Government of India to negative the proposal.—*Englishman.*

We hear from Pondicherry that great complaints are made against the quality of the salt now being delivered by the British Government. Experts say it is a mixture of sea and spontaneous or earth salt, is prejudicial to health, and produces eruptions and skin diseases. Formerly the supply for Pondicherry was drawn from Mercanam, but since the closing of that depôt, it has, we understand, come from Madras.

The results of the late floods in Tanjore, as described in a report by the Collector of the distrit, were that the whole tract of country bordering on the sea-coast, about 60 miles from north to south by 10 to 15 miles from east to west, comprising the greater part of the Tiruturpundi Taluk, a large portion of Negapatam, parts of Nannilam, Mayavaram, and Shiyali, as well as a great portion of the Mannargudi Taluks was submerged, and the crops over an area of more than 248 square miles were more or less destroyed.

Arrangements are being made for the construction of a Vegetable and Fruit Market, at Poona, a convenience very much needed, especially during the monsoons. Much smaller stations than Poona can boast of well-built markets such as Ahmednugger and other places; and why should not Poona have one in the City, and another in the Cantonment? The present low, miserable huts used by sellers of vegetables and fruits are not at all suitable, and the sooner we have a regular market for the sale of these commodities the better.

The Chief Engineer for Irrigation has recently submitted to Government a note on a report of the Superintending Engineer regarding the Mylapore tank. The Government accepts the suggestions of the Chief Engineer for Irrigation. The Collector will accordingly arrange to take charge of all tanks in the Madras district, and submit revised proposals for watching the bank of the Mylapore tank when full. He will, of course, seek for the advice of the Public Works officers when any work requiring professional advice has to be executed.

The Commissioner of the Patna Division is having a careful watch kept upon the tracts affected by the drought of last year. In a report to Government, dated March 30th, Mr. Halliday says "the Sub-Divisional Officer of Behar has personally enquired into the condition of a large number of villages, with the general result that there is at last a tolerable *rabi* crop in his sub-division, and that there is no real distress at present. The water-supply is evidently running short in many places, but it does not seem to be exhausted anywhere as yet.

Mr. Kaikhosru N. Kabrajee, Editor of the *Rast Goftar*, has opened a subscription for the presentation of a rifle to Mr. Hormusjee Eduljee Kotwal, employed in the Forest Department of the Native State of Vanada, who has killed over one hundred tigers in and about the native territory. Mr. Kotwal's prowess in slaying such a large number of tigers has been highly spoken of by local sportsmen, and it is with a view to showing an appreciation of his services to humanity that a modest sum of about three or four hundred rupees is invited from the public.

The Cashmere Government is averse to foreigners acquiring territorial rights at Srinugger, but would be considerably annoyed, no doubt, at any hint of reciprocity. His Highness the Maharaja of Cashmere has been at some pains to acquire house property in Lahore; and besides houses, owns the serai known as the Sultan Serai. As regards the latter—which is an Indian version of Punch's "Mud Salad Market"—his Highness can hardly be regarded as a model landlord. The state of the Sultan Serai is occupying the serious attention of the Lahore Municipality, and it was high time, indeed, that something was done to deal with what is nothing short of a grave danger to the public health.

We understand that the Jhelum authorities have made an enquiry into the case of Geba, the man who found his way to England, in order to complain of the injustice done to him in transferring his claim to some seven bigas of land to powerful and hostile neighbors. He walked from Jhelum to Bombay; there was taken on board a ship for Jedda; walked thence to Jaffa, and got a passage to Constantinople, whence he wandered through Turkey and Hungary where he was charitably received. He then walked through the length of Germany to Hamburg, and was thence forwarded to England, which he reached three years after leaving Jhelum. There seems to be a probability that he has been the victim of a conspiracy, which prevents his obtaining evidence in his favor, and, even should he return, he may not be able to contend against the hostile faction, unless they are bound over by the authorities to keep the peace, in order to enable him to prove his case. In any case it would be better for Geba to turn to the Punjab, and we hope that the authorities will override any technicalities for the sake of awarding substantial justice to a petitioner whose poverty and ignorance may have prevented his obtaining legal redress hitherto.

Selections.

REFLECTIONS ON THE RELATIVE POSITIONS OF BEET SUGAR AND CANE SUGAR, AS PRODUCED RESPECTIVELY FOR REFINING PURPOSES IN GERMANY AND DEMERARA.

By Wm. Russell, Demerara.

It is of the utmost importance to our sugar colonies, to know at what price beet sugar can be sold, so as to leave a working profit. Many statements, some very absurd ones, have been made upon this point.

In order to ascertain the real state of the case, Mr. Russell, of Demerara, has recently paid a visit to the beet sugar centres of the continent, and has printed, in pamphlet form, for private circulation, the results of his valuable investigations. He sets forth the advantages and disadvantages of both the cane and the beet industries, and upon weighing them finds them very evenly balanced; still, with strict economy and the best machinery, the conclusion he has come to is,—that cane growers may yet hold their own against their formidable beet competitors.

[With Mr. Russell's permission we are able to reproduce his valuable paper.—Ed., *S.C.*]

The present state of the sugar trade, when the smaller islands of the Antilles must give up that industry, and even the fine Colonies of Trinidad and British Guiana, with all the superior machinery lately introduced there, cannot produce sugar within £5 per ton of present prices, which are, say £14 to £17 per ton in England, according to quality, has assumed a much more serious aspect than onlookers can have any idea of, because in our West Indian possessions there is no other industry which can be taken up to replace sugar-cane. Cotton and Coffee in the past had to succumb for want of labour. Under these circumstances, the writer thought it good to make himself personally acquainted with the beet industry in all its bearings, and with that object in view he lately devoted some weeks to investigate the matter in the beet sugar producing districts of North Germany. After much intercourse with agriculturists, engineers, and manufacturers of sugar in its various forms, he was led to the following reflections:—

Industrious Habits of the People:—This must strike the most casual observer. From the dog which watches the steading by night and draws its little cartload of market produce by day, to the cow which gives up its milk in the morning, and then goes out to work on the land,—from the head of the household to the urchin who plods to school,—all are workers. In the large agricultural villages which have sprung up in many small principalities abounding in Germany, the people have allotments of land, often peculiar in outline and of limited area. In these patches one sees all kinds of produce—cabbages, potatoes, cereals, but invariably a plot of sugar beet, this being to the German, what the pig is to the Irishman, ready money; because at no great distance from these communities is sure to stand one of those huge factories for converting the roots into sugar, where ready money is paid for the roots when delivered.

Labour Question.—This seems reduced to a very low standpoint, 1s. 6d. (eighteen pence) with potatoes, light, and lodgings for men working in the sugar factories, 11 hour spells is a long way below West Indian rates, and for scientific men, such as working chemists, a salary of £6 per month with board is certainly under what is paid in any other country. The hands on the farms seem well clad, and their fare, although common, keeps them in robust health. Apparently they are equally efficient with our English agricultural population.

Large Farms.—These extend to about 5,000 morgens and over, say, up to 3,000 English acres, and over, and are conducted on sound principles, the three-shift rotation predominating, *i. e.*, one-third of the land being in cereals, and very little grass, one-third in potatoes, and one-third in sugar beet. Thus the land runs no chance of being sickened by continual cropping of one product. The straw manure, of which a large quantity is made by bullocks, which are chiefly fed on exhausted beet slices, and also by the large number of work animals, is all used for the potatoe and cereal crops—the beets being manured by nitrogenus and superphosphate manures, three hundred-weights of nitrate of soda and two of superphosphate to the morgen being an ordinary dose.

Quality and Cost of Land.—The heavy loam in the valleys of the Rhine, Elbe and other rivers, is considered the best for the growth of beet, and such lands sell as high as £150 per English acre. Sandy soil, of which one sees a vast extent, is worth £90 to £100 per acre, and the latter class of land, where properly manured, and with a favourable seed time with sufficient moisture to start the plants, gives excellent crops of sweet roots, this being the great desideratum in beet culture. Anything over 10 tons of roots per morgen is looked upon with disfavour by the manufacturer of sugar, as the larger the roots are the more water they contain in proportion to the sugar, and he would thus be paying duty on an extra quantity of water. In fact, the manufacturer insists upon supplying the seed, it being secured from improved roots that have been selected from time to time on chemical analysis, until it is not uncomon now to find roots analysing as high as 17 per cent of sugar against 7 to 8 per cent when the roots were originally taken in hand as a raw product from which to extract sugar.

Extent of Beet Culture.—The Government statistics for the 1882-83 campaign gave an average of 9½ tons of beet-roots per morgen, which, in round numbers, gave one ton of sugar, 5⅞ cwts. of molasses, and 4 tons of cattle food. Lecht's forecast of the present campaign, 1884-85, puts the German crop at 1,100,000 tons of sugar; this represents 1,100,000 morgens in beet cultivation. Even this is exceeded by 50,000 tons in Licht's circular for January of this year.

Factories.—These are computed at 352, of which no less than 35 new ones were erected last year, at a cost of £1,000,000 sterling. This gave rise to an extension of cultivation to the extent of beet requisite to make 145,000 tons of sugar over that of the campaign of 1883-84, which latter was 986,403 tons. Here we see that the high prices of sugar ruling for the previous two years, coupled with the increased richness of the roots and reduced cost of manufacture into sugar, and also with the improved appliances to work over the molasses, gave such a stimulus to production, that if such prices had continued for a few years, Germany would have increased the production even faster than it did for the last three years, during which it has risen by immense strides from 644,775 tons in 1881-82, to the expected crop of 1,100,000 in 1884-85.

The following calculations are based on—

A morgen = 6/10 of an English acre.
A mark = 1 shilling.
A centner = 1 cwt. English.

Cost of cultivation per morgen—

Rent	marks 36
Ploughing	12
Hand Weeding	8
Artificial Manure	30
Grubbing	10
Singling and Weeding	2
Pulling and Carrying	10
Carrying to Factory	15
Discharging	2
	125 shillings.
By 9½ tons of beet per morgen = 190 cwt. at 1s. 3d. stg. ...	237-6
Farmer's profits per morgen ...	112-6 or £5-12-6

This seems at first sight an immense profit, but when it is taken into account that the beet-roots only cover one-third of the farm, and that the other two-thirds do not do much more than pay expenses—also that no charge is included for management, tear and wear of stock, and interest on farmer's capital, it sinks considerably. Thus the profit of £5 12s. 6d. per morgen on the beet, divided over the whole area under cultivation, gives an average all over of 37s. 6d. per morgen, or a sum about equal to the rent paid.

Manufacturers and State Losses on Exported Sugar.

	£ s. d.	£ s. d.	
Disbursement—			
190 cwt. Roots at 1s. 3d. per cwt., producing one ton of sugar		11 17 6	
Duty on same, 9 6/10d. do.		7 12 0	
Manufacture, at 6d. do.		4 15 0	
		£24 4 6	
Less—			
Offal Crop and Draw-back.			
5·7 cwt. Molasses, at 2s. 8d. net...	0 15 2		
4·2 tons Exhausted Slices and Cake, Lime, &c.	1 1 0		
Draw-back, 9s. per cwt. Sugar ...	9 0 [illegible]		
		10 16 2	
		£13 8 4	
Selling at 10*s.* 6*d.* f. o. b. Hamburg ...		10 10 0	
Manufacturer's Loss		£2 18 4	per ton.
State Loss, being the excess allowed for drawback on sugar ...	£9 0 0		
Over the amount levied for duty on Roots	7 12 0		
		1 8 0	per ton.
Natural Loss on Free Trade principle		£4 6 4	per ton.
To which should be added extra carriage to port of shipment, in the case of factories at a distance from Hamburg.			

It would then seem that the *present price of sugar is four pounds six shillings and four pence per ton under the cost of production in* *well-managed factories*—a state of things which cannot last, however anxious the continental nations may be to kill out the sugarcane production and so have the market in their own hands.

Sugar from Molasses.—The 3 % of molasses on the weight of the roots contains about 50 % of sugar, and this is purchased by a new set of manufacturers who, by a chemical process, recover 30 % of the contained sugar as exportable sugar, and upon this sugar, which sells in the Clyde at 8*s.* to 8*s.* 6*d.* per cwt., they get a drawback from the Government of 9*s.* per cwt. !

This is decidedly the strangest anomally of all, and cannot be allowed to remain in force, as the fabricants are clamouring against it. It is quite true that the roots, having once paid the duty, the fabricant is at liberty to make the most out of them which well directed science indicates ; but it clearly robs the revenue in a double way, for when the present fiscal tariff was arranged, it was considered that 12 tons of beet would be necessary to make a ton of sugar, which, at 9d. per cwt. duty on beets, would entitle the exporter to a drawback of £9 per ton only, and that there would be 7½ cwt. molasses to go to the distilleries, on which a revenue would be recovered. Now this is evaded, and the product is manipulated into an article worth less than the drawback allowed upon it. This drawback was maintained at £9 per ton after the duty on beets had been raised to its present figure of 9 6/10d. per cwt.

German Consumption of Sugar.—This is given as 16 pounds per head, and the selling price in Germany is one penny per pound higher than in Great Britain, so that the tax upon the sugar beet causes a direct tax on the consumers of 1s. 6d. per annum. Taking the population of Germany at 42¾ millions at 16 pounds per head, home consumption is roughly 300,000 tons, leaving 800,000 tons for export, on which a drawback of £1 8s. over the duty collected, or £1,120,000, is paid out of the general revenue to encourage a trade which brings into Germany from abroad as the value of sugar exported, at present prices, £8,400,000 : evidently the game is not worth the candle now, but when this sum is doubled and more, as it has been in the past when sugar was selling at 22s. to 23s. then there might be some excuse for encouraging this industry which gives work and wages to such a large class of the community.

We have already seen that the loss to the manufacturer on sugar exported is £2 18s. 4d. per ton, and to the Imperial Revenue £1 8s., therefore—

800,000 Tons at £2 18s. 4d.	...	£2,333,333	loss to fabricants.
800,000 ,, 1 8s. 0d.	...	1,120,000	,, Impl. revenue.
Total National loss	...	£3,453,333	on exported sugar.

A tidy sum, indeed, in order to give England cheap sugar. The writer cannot think the German Government is likely to put up with this long, especially seeing they want money.

Political Aspect.—

German population		42,750,000
Consumption, 16 pounds per head per annum ...		300,000 tons.
Total crop (1884-5, Mr. Licht's figures) ...		1,100,000 ,,
Leaving for export		800,000 ,,
Total duty levied on beet for producing 1,000,000 tons of sugar, at £7 12s. per ton		£8,360,000
Deduct drawback, £9 per ton, consisting of :—		
Duty returned on export of 800,000 tons at £7 12s.	£6,080,000	
Bounty paid by State on export of 800,000 tons at £1 8s. ...	1,120,800	
		7,200,000
Receipts to Exchequer from sugar duties without deducting cost of collection, and after allowing for drawback		£1,120,000

The Future.—With cereals pouring into Europe from the western countries, such as the United States, Canada, &c., and especially from the East Indies, with its hordes of people willing to work for the merest pittance, it seems evident that sugar beet must be the principal industry in Germany, and in fact in the bulk of the continental countries, even if all state aid is withheld Every beet factory turning out 3,000 tons of sugar for the campaign costs £35,000, and the shares are divided over a large proportion of the population, so that certain concessions on the part of the landowners and cultivators, and also the assistance that science may confer upon the industry, will, the writer thinks, enable the fabricants to go on making a fair profit on the capital invested, and sugar will gradually rise to its normal paying price of £15 to £17 per ton for beet 88°/ₒ sugar. The important question for the West Indians is how to keep out of insolvency while the natural settling down process is going on. It is assumed that 20 to 25 °/ₒ less roots will be planted for the campaign 1884-5 ; this, coupled to the abandonment of a large area of sugarcane, and a probable extension of consumption, may bring about an equilibrium sooner than present prospects lead one to expect.

CONCLUSIONS.

On calmly considering the formation, there can be no doubt left in any one's mind that beetroot sugar has stolen a march on cane sugar, and that the only way by which the makers of the latter can maintain a place in the race is to further avail themselves of everything that sound mechanical and scientific research can bring to bear on their industry. Already great strides have been made in the more advanced colonies, though few will perhaps believe that the sugarcane planters have already succeeded in recovering from the sugarcane quite as large a per centage of sugar as their opponents have done from the beet, as is shown in the following condensed table :—

BEET.	112lb.		SUGAR-CANE.		112lb.
Sugar in roots ...	15·68		Sugar in cane ...		14·78
			By 1st Process.		
1st jet ...	10·59		Sugar lost in megass ...	4·70	
2nd ,, ...	1·00		Sugar extracted ...	*10·08	
3rd ,, ...	0·02				14·78
In molasses ...	1·50	13·11	*Viz., in crystals ...	7·26	
			in molasses ...	2·82	
					10·08
			By 2nd Process.		
			Dry crystals ...	1·42	
			In molasses ...	·94	
Losses ...		2·57	Loss in megass ..		1·34
		15·68			14·78

Advantages of Beet Sugar over Cane Sugar.—The great advantages that the Continental agriculturist and manufacturer have over the Colonial are—

1st.—A plentiful supply of willing hands to labour at moderate wages.

2nd.—Short time necessary for raw products to come to maturity.

3rd.—Favourite crops to rotate with beet and a climate suitable for growth of cereals and potatoes, feeding of stock, &c., &c.,

4th.—The roots of such a texture that they can be easily manipulated, while the residue is of considerable importance as cattle food.

5th.—Cheap fuel, with proximity to the best and largest market in the world, and low freights.

6th.—Climate of Europe more favourable for working saccharine solutions owing to absence of ferment germs, rendering the manufacture so much more simple.

On the contrary the Colonists have to contend against—

1st. A sparse population who, in the absence of a winter and all inducement to lay by something for old age, cannot be depended upon for any continuous labour ; hence necessity of importing for strangers at a great cost to prosecute the sugar industry.

2nd.—The sugar cane takes from 12 to 16 months to come to maturity, and is accompanied by a luxuriant growth of weeds. In a tropical climate much labour is required to keep these down, and also to promote the circulation of air and allow the sun to penetrate among the ripening canes.

3rd.—Absence of any crops other than plantains to rotate with canes, and as the former are perishable, and the home wants limited, they could only be grown at a loss.

4th.—The flinty texture of the sugar-cane stalk and its being as yet only of value as fuel, militate against any process of manufacture that would destroy its value as such.

5th.—The nearest market in which they can purchase coals is Great Britain, and freight and charges raise their cost to 36s. and 37s. per ton before they can be delivered at furnaces. Freight home is also high.

6th.—The necessity of manufacturing the cane into sugar immediately after being cut, as immediate deterioration sets in—all saccharine running into acidity and fermentation.

ADVANTAGES OF CANE SUGAR OVER BEET SUGAR

1st.—A large weight of cane can be grown on a given area of land, and at cheaper rate than beet roots. 18 tons of sugar cane per morgen are grown with good tillage at 12s. 6d per ton—beet costs 13s. 1½d. per ton, and produces 10 tons per morgen.

2nd.—The sugar contained in the sugar cane is of greater purity than is found in the beet, hence less loss in purification, and the finished cane sugar is on an average 6° higher in analysis, and brings in to the manufacturer at least 2s. 6d. per cwt. more, even after allowing for the extra cost of freight from Demerara, as compared with that from North Germany to this country.

3rd.—Beet sugar must be sold as made, and is often forced on the market at unfavourable times, because it suffers heavily from increase of glucose if stored, and a heavy penalty is exacted for delivery of any but fresh-manufactured beet-crystals. In Paris, at present, beet crystals of old crop are almost unsaleable.

Weighing all these *pros* and *cons*, it is evident that the two industries are very evenly balanced, and that those of the sugarcane planters who are in a position to avail themselves of the very best appliances in manufacture might, under improved conditions of labour, look forward to times when they would hold their own against their formidable rival. One thing is evident, and that is, that strict economy must be practised in our colonies. The days when sugar at £25 to £30 could stand the enormous public expenditure which characterised some of our leading West Indian Colonies are past, and both governors and governed must be prepared to reduce taxes and expenses to the extent required for producing sugar at one-third less cost than hitherto.

Myreside, Elgin, N.B., 12th January, 1885.—*The Sugar-cane.*

APICULTURE.

From J. C. DOUGLAS, Esq., To the Secretary to the Government of India, dated 9th January 1885.

I have the honor to report, for your information and for record, the results of my apicultural observations during the past year.

2. I commenced the year with two stocks of the variety of *Apis indica* indigenous to Lower Bengal ; one of these was a swarm I captured near my office at Alipore. As the weather

became warm, these bees built comb and they worked out artificial comb foundation specially made for them from an engraved plate; from the rapidity with which they worked at the commencement of the season, I anticipated they would prove of value. Before, however, they had half filled their hives, they prepared to swarm, bred drones and queens, and I divided the two stocks into four. These did well, but I got absolutely no surplus honey. I took a few ounces but I had to feed much more.

3. This variety of *Apis indica* is kept by villagers; they do not cultivate it at all, but merely encourage the bee by inserting earthen vessels in the house walls, and they take the honey by taking all the combs, so that the stock perishes. I have received many estimates of the quantity of honey obtained, but they differ widely and are quite unreliable. Having taken many stocks and purchased others, and having kept the bee during two seasons, I am of opinion that it is commercially valueless. Possibly 5 or 6 pounds of honey might, under exceptional circumstances, be obtained by sacrificing the bees, but this is obviously insufficient to repay cultivation. This estimate is confirmed by an account of the cultivation of *A. indica* in Ceylon.—Journal, Ceylon Branch, Royal Asiatic Society, Volume VII, part 1, No. 23. Of the stocks I had, I gave one to a station master on the East Indian Railway and one to a native gentleman: both those are in hives. Mr. Stocks, of Berhampore, has a stock, from which he recently took half a pound of honey with an extractor. Mr. Stocks being favorably situated and having the appliances will further test the value of this bee under the most favorable circumstances. This bee is not so easily handled as good-tempered Italian, but is as easily managed as the European black bee and is better tempered than the cross between the black and Italian.

4. This bee is valueless, because—(1) its stocks are too light in comb and bees; (2) it swarms too frequently, so that without trouble and much attention only, very small hives can be filled; (3) the surplus honey is very small in quantity; (4) the bees do not defend their hive against moth and other vermin, so they readily succumb to the moth, particularly during the rains.

5. Another variety found in Bhutan, building 5½ cells to the inch appears far superior to the variety found in Lower Bengal. Captain R. Fulton, B.S.C., stationed at Buxva, has kept this variety. He gave me two stocks, one of which was very weak and failed; the other I have under observation. Captain R. Fulton also gave a stock to a gentleman at Barrackpore. This variety is larger and builds larger cells than the varieties found in the plains, at Chumba, and cultivated about Mussoorie and elsewhere. I am informed its stocks are sufficiently heavy, but I have no data from which to judge of its commercial value; on this point I shall be able to give an opinion probably by the end of June next. This variety or species is, I believe, undescribed; the stock I have is exceedingly mild in disposition, the workers go out very early, and they readily use the comb of the Italian bees slightly contracting the cell by their outer edge, but they have the failing of not keeping their hive clear of vermin, particularly moth, which they suffer to live unmolested apparently on the floor-board of their hive. Should this variety prove of value, stocks can be readily obtained, but I am decidedly of opinion this variety is very inferior in value to the Italian bee, even though it may prove sufficiently valuable to warrant its cultivation.

6. The variety found cultivated at Bushahr by Mr. Minniken appears to me equal to the European hive bees in productiveness, it is closely allied to the European species, and appears somewhat large in size; whether it can be readily handled, whether it defends itself against moth and other vermin, and whether or not it swarms to such an extent as to reduce its value, can only be ascertained by observation. This variety or species is, I believe, undescribed. I am of opinion measures should be taken as early as practicable to ascertain the economic value under cultivation of this species. I have written to Mr. Minniken on the subject, and I now send two boxes with instructions for packing two stocks of these bees, which I should like to receive as early as practicable to admit of their being observed during the coming season, provided you are pleased to obtain them for me.

7. As to the possibility of cultivating the Italian bee, I am now quite convinced it can most certainly be cultivated here. I brought out five queens, of which I saved two, and in 1883 these two filled their hives, although they had at first but a few hundred bees; I had nursed these into strong stocks, when one of the queens died; I had no drones, and the rains prevented drone breeding. I had therefore only one stock left. I wrote for four queens, and these were sent by Sir G. Birdwood, but only two arrived alive. One of these became diseased, and I had to destroy her. I again sent for four stocks direct from Milan; of these I saved two queens, which are doing well. I bred a queen, the first bred in India; this queen is doing very well; her stock is very vigorous. I was obliged to remove it from the apiary as it attacked another stock, and robbed it of all its stores. I have now five queens with bees; the stocks are still weak, but I have no doubt whatever I shall be able to distribute during the coming season queens and bees to perhaps a dozen persons who are prepared to receive them. One of the queens was born in 1882; she is now 2½ years old at least, and has been in India more than two years; she has furnished bees and brood for all the other queens, and to keep up diseased stocks, and last year I took 15lbs of excellent honey from her stock, which, as it was kept in Park-street, Calcutta, had very little opportunity of furnishing a rich harvest. I found the bees did exceedingly well; they kept their hives clear of wax, moth and other vermin. I found two deaths—head moths in one hive, evidently destroyed by bees. I find he bees can get pollen all the year round; it was feared they might not get anything in December and January, but they get almost too much pollen during these months; they are getting honey now.

8. The largest yield per stock I have had reported for *Apis indica* is 80 lbs. of honey; this is reported by Mr. Seymour of Mussooree. This gentleman has kept bees for several years in Australia, and his testimony is therefore of considerable value. He thinks bee-keeping with *Apis indica* as found about Mussooree very inferior economically to the culture of *A. mellifica* in Australia. Setting aside such figures as 500 and 600 lbs. per stock in America, G. M. Doolittle, an apiarist of great experience, considers 50 lbs. of comb honey or 75 lbs. of extracted honey an average crop per stock. Thirty one Canadian bee-keepers had 1,484 stocks in the spring of 1884; increased to 2,669 stocks during the year, they took 37,250 lbs. of comb honey and 59,845 lbs. of extracted honey. I think one pound of comb honey equal to quite 1½ lbs. of extracted, and so estimated, the yield as above was equal to an average of 80 lbs. of extracted honey and an increase of 90 per cent in stocks of bees. The crop of the year was considered scarcely up to the average. The severe and long American and European winters render apiculture more precarious than in the plains of India, or even in the hills. The great superiority of *A. mellifica* over *A. indica* and the importance of acclimatising the former is apparent; the Bushahr bee might prove as productive as or more than *A. mellifica*.

9. I could distribute stocks last year had I wished, the one queen would have supplied bees, queens and drones, but I preferred to import other queens rather than breed in and in. The journey from Europe is very injurious to the queens: even those which appear to arrive in good health are commonly found ultimately to have suffered in their laying powers, or to have become diseased. Knowledge of this fact induced me to import a number of queens in the hope of saving few, and the ignoring of this has caused the failure of all previous attempts to induce the European bee into India.

10. During the year I have issued a number of hives and other appliances to persons anxious to take up apiculture in different parts of India; these persons are practising and learning on *Apis indica*. The issue of Italian bees during the coming season will, I have no doubt, confirm these persons in their resolves, and spread the practice to many others. The Italian bees will be issued to bee-keepers in British Burmah, Assam, Orissa, Bengal Proper, Mussooree and Dehra, Bhootan, and elsewhere.

11. As to the natural history of Indian bees of the genus *Apis* very little is known: several varieties of *A. indica* and *dorsata*, and *A. florea* have been described, but there is much confusion in naming them: in most cases the descriptions are incomplete, not including the descriptions of drone, queen, and comb; life history has not been studied, and some Indian honey bees have not been described at all, being quite unknown to European naturalists. In 1862, Dr. Gerstalker of Berlin discussed the classification of Indian honey bees in a paper read to the "Wan der Versammlung Duntscher Bienenwirthe," and pointed out the confusion that existed in nomenclature and excellent grounds for a classification, so far as the available knowledge admitted. Since the decease of the late Mr. F. Smith, I am informed there is no member of the British Museum staff specially qualified by aknowledge of this genus of insects.

12. In my little Handbook of Bee keeping for India, I described a typical *A. indica* and omitted all mention of the varieties and their synonymous names; I am about to carefully examine the collection. I have, and I hope to obtain, other specimens. Specimens, particularly, if including the drone, queen, and a small piece of comb, would be of great service, I have no doubt whatever. I shall be able to add considerably to the existing knowledge of Indian honey bees and their life history, as well as discover some of economic value in both the Bhutan and Bushahr bees: it appears probable insects of economic value have already been discovered, it remains to decide by observation how these compare severally with the Italian bee now rendered available.

13. As I am about to examine, measure, and describe all the Indian honey bees of which I can obtain specimens, and also to endeavour to discover their affinities and the bearings of these on the origin of the European hive bee, which probably originated in Asia, and as I may not only be able to indicate the best variety and best mode of cultivating it for the benefit of the natives of India, but I may also obtain information of economic and scientific importance to European and American apiculture, I beg that any *spare* specimens of the number collected by Dr. G. Bidie may be sent to me.

Instruction for transferring and packing Bees in portable Hive.

Smoke the bees slightly, spray them with thin syrup unless they have honey accessible in their combs; then with smoke, by shaking and brushing the bees from the combs, remove the combs one at a time. Fit the combs into the frames against the top bar, cutting the top of the comb straight, if necessary, and filling up the *frames* with pieces of comb, if available. The wirefixers are for holding the comb in the frames while tying it in. Tie the comb in the frames by stout twine at every two inches and vertically and horizontally. Very white new combs should be rejected, very thick heavy combs containing much honey and sealed may be pared with a knife to one inch. The brood combs, if any, should be placed in the centre frames. If there be much honey in the combs, other food may not be necessary, but full combs travel badly, and food may be given by mixing honey and crushed white sugar to a stiff paste and filling the foodbox with it. The water bottle should be filled, and so corked that the water does not come out unless the bottle be shaken.

2. The combs having been transferred, shake or brush the remaining bees into the box; close carefully with cloth, or by other means, the ventilators of the box, cover the top and open the door; place the portable hive in the place of the old hive. The portable hive with its entrance, as far as practicable, with some place as the entrance of the old hive, should be left till evening; after dark, when the bees are all in, the door should be closed, the ventilators opened, and the box despatched.

3. If the weather be very cold, the side ventilators may be partly covered, but otherwise they should be left quite uncovered One brood comb at least should be inserted, if possible, even if from another stock, as the presence of brood prevents absconding.

4. If detained on the road, the bees may be allowed to fly, the door being opened, and closed again after dark. Whenever the door is opened, the side ventilators must be completely closed.

Unless the boxes are to be closed longer than a week, it would not be desirable to open the hive boxes *en route*, and then only if some one is present who could hive the bees if they swarmed out.

5. It will be found convenient in transferring to remove all the frames from the box and put the lid on; as each comb is cut out of the old hive, brush the bees from it into the box and put on the cover; if the principal cluster be gently lifted and shaken into the box, there will be no fear of the queen having been left behind.

See also "Driving" and "Transferring" in the Handbook of Bee-keeping for India.

6. The boxes contain a veil, smoker, spray diffuser, and on dozen comb fixers; the articles should be retained excepting the latter, which may, if necessary, be left in the comb, but should, if practicable, be removed.

THE TRANSPORT OF TIMBER.

THE American sawmills, established long before anything of a similar kind in England, showed that cheap transport is the basis of any profitable wood industry. The present perfection of mechanical appliances in the lumber domain began with the splendid water-carriage-ways given of the great rivers of the United States and Canada. These, though accompanied by timber jams, far outrival any railroad facilities of transport.

The ease with which logs may be thus taken from the forest to the sawmill, and afterwards to the seaboard for exportation, is the foundation of the great Canadian timber trade. Dull times appear to be putting more sprags in its chariot-wheels of progress. But this shutting down the vacuum breaks will be only the greatest national blessing if, as *Forest and Stream* says, the Canadian and United States Legislatures at last open their eyes to the folly of alienating public forests for a dollar and a quarter an acre, which it will be impossible to replace ten years hence at fifty dollars an acre. But the British landowner is handicapped by his only available carriers, the great railway companies, and is at present in a sorry plight. Notices of bills for the purpose of increasing rates, specially terminals, have been lodged by these great corporations, which, if carried, will render the transport of home-grown timber unremunerative. If the prospects of successful improvements of estates by forestal enterprise are not to vanish as chimeras, instant decided action must be taken.—*Forestry*.

THE AUSTRALIAN BOTTLE-TREE.

THIS oddity of the Australian woods may not be unfamiliar to many British readers. For the frequency of inter-travel betwixt the youngest of our southern colonies, Queensland, the dwelling-place of the bottle tree, is amongst the noted features of British home life. This tree—*Sterculaвria rupestris*, (Benth); *Bracbhychiton Delabechii*, (F. Mueller)—belongs to a peculiar order, the *Sterculariaccæ*, confined to the tropics, noted for its unique forms, such as that of the baobab tree, but possessing as well the chocolate and cocoa tree. There are several species of this genus in Australia, only one of which is known to extend beyond the island continent. None of these have as yet proved economically useful. But in Asia several members of the order yield useful furniture wood; one yields material for canoe-building, another supplies good fibre. The representative Sterculiarias of the Amazon district rank in height and magnificence as the monarchs of the forest.—*Forestry*.

THE WEIGHT OF AN AXE.

I WELL remember my first axe, and my early experience with it It weighed 4½lbs., being the heaviest one I could find at the time. I was fresh from school—fresh from a class in natural philosophy, one of my favourite studies.

I knew all about inertia, and had learned something of the force of gravity and the laws of falling bodies; had rightly guessed that chopping wood might be hard work, and determined that my knowledge of physics should help me out.

I would have a heavy axe, a long handle—would move slowly, and take strokes that would *count* when they fell. My axe-handle was 34 inches in length, the longest one in the store. I had hired a tough little French Canadian, weighing about 120 lbs., to help me at this work. When he came, he brought an axe—a mere toy, I call it. I think it weighed 2½ lbs., with a handle only 26 inches long. I told him I had a fair-size job for him, and thought it would pay him to buy a full-grown axe. He smiled, and said he guessed his would do. I tried to explain to him the beauties of a heavy axe, and the wonderful advantage of a long handle. But it was all in vain; I was only wasting time; he could not understand it.

"Poor fellow," I thought, "he knows nothing of the beautiful science of physics. It is too bad that he should thus waste his strength through ignorance, and be unwilling to listen to the voice of wisdom."

We went to the wood-lot and began work. I had decided that we would work separately during the first day or two, in order that I might show him what I could do.

As I began to swing my axe, I felt proud of its ponderous blows that rang through the woods, and rather pitied the poor fellow who was drumming away with his little axe, taking about two blows to my one.

Presently I had to stop to rest, and then again, and still again. But Joe, my man, kept pecking away quietly, steadily, and easily.

Every few minutes I would stop to take breath; but Joe seemed perfectly able to do all necessary breathing without stopping his work for the purpose.

When night came, we piled up our wood and measured it. Joe's pile measured 1½ cords; mine only ¾ of a cord.

During the early part of the day, I had planned giving Joe another lesson in the evening, to see if I could not make him understand the elementary principles of wood-cutting, and the philosophical requirements of an axe.

But when night came I decided that perhaps it would be as well to let him go on in ignorance, and thereafter remained silent on the subject.

The next day I felt lame, and stayed at home. Joe put up his cord and a half as usual.

When I went to the woods again, Joe and I worked together. Not many days passed before I found an excuse for buying a lighter axe and a shorter handle. And every axe and handle that I have bought since then, has been lighter and shorter than its predecessor.

Whenever I use an axe now, I select one very much like Joe's, both in weight and length of handle. I can use this without getting at all out of breath, and can hit twice in the same place. The result is, I can do more and better work, and save a vast amount of strength.

I write this as a word of caution to the inexperienced wood-chopper, when about to purchase an axe.—H. L. C., in *Albany Cultivator*.

A SKILFUL SURGICAL OPERATION.

THE American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billroth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms:—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "*all gone*" sensation; a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow; the hands and feet become cold and sticky—a cold perspiration. The sufferers feel tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often-times there is a palpitation of the heart, and the patient fears he may have heart disease. Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomes closed, or nearly so. Although this disease is indeed alarming, sufferers with the above-named symptoms should not feel nervous, for nine hundred and ninety-nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner. The safest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White (Limited), 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

ST. MARY-STREET, PETERBOROUGH.
November 29th, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr. A. J. WHITE. WILLIAM BRENT.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues,

Registered No. 182.]

THE
INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, MAY 16, 1885. [No. 20.

Crop and Weather Report.

[FOR THE WEEK ENDING 6TH MAY 1885.]

General Remarks.—Slight rain has fallen in a few districts in Madras and Mysore. In Bombay, some rain is reported from parts of Dharwar, Belgaum and Kaladgi, and in the Punjab from the Umritsur, Lahore, Rawul Pindee, Shahpore, and Peshawar districts. In Bengal rain has fallen generally throughout the Province, and has done much good to the standing crops. In Assam heavy rain fell in the four reporting districts of the Brahmaputra Valley and in Cachar.

Agricultural prospects remain unchanged in Madras, and continue uncertain in Mysore. In Coorg the growing crops are doing well, and the prospects of the season are good.

The *rabi* harvest is nearly over in Bombay and the North-Western Provinces and Oudh; in the latter an average outturn is expected. Preparations for the *kharif* are going on. In the Punjab the *rabi* harvest continues in active progress, and *kharif* sowings have commenced. Threshing and winnowing of the *rabi*, and *kharif* preparations, are in progress in the Central Provinces.

In the Berars, the Nizam's Territories, and in the Central India and Rajpootana States, harvest operations continue, and prospects are generally good.

In Bengal the recent, rain has facilitated agricultural operations and improved the prospects of the standing crops. Ploughing and sowing continue. More rain is wanted generally throughout the Province.

In Assam ploughing and sowing are in hand, prospects are good.

Cholera is chiefly prevalent in parts of Bombay, Bengal, and the Central Provinces, but public health is generally good.

Prices are generally steady, except in Bengal, where the price of rice has on the whole risen.

Madras.—General prospects fair, except in parts of Bellary and Anantapore.

Bombay.—Slight rain in parts of Dharwar, Belgaum, and Kaladgi. *Rabi* harvest completed in all districts, except Skikarpore and Upper Sind Frontier: ground being prepared for *kharif* crops in parts of eight districts. Scarcity of fodder and drinking-water continues in parts of several talukas of Dharwar and Belgaum. Fever and cattle-disease in parts of 9, cholera in parts of 15, and small-pox in parts of 18 districts.

Bengal.—There has been rain in every district of Bengal Proper, and in about half a-dozen districts in other parts of the province. It has much facilitated agricultural operations, and improved the prospects of standing crops. More rain is, however, generally wanted all over the province. Ploughing of lands and sowing of early paddy is going on. Price of rice has, on the whole, risen. Cholera and small-pox prevail in many districts.

N.-W. Provinces and Oudh.—Weather seasonable. Harvesting nearly over; an average outturn expected. Markets well supplied and prices steady. Cases of cholera and small-pox reported from some districts.

Punjab.—Rain in Umritsur, Lahore, Rawul Pindee, Shahpore, and Peshawur districts. A few cases of cholera still in the Lahore and Umballa districts, and slight fever in Peshawur; health otherwise good. Prices almost stationary.

Central Provinces.—The weather has been clear and hot, but is to-day again cloudy and stormy. Prospects remain unchanged, and prices steady. Cholera is said to be increasing in Hoshungabad, Khandwa, and Raipore.

British Burmah.—Cholera severe in town of Pegu, slight in Akyab, Bassein, and Toungoo districts. Weather hot.

Assam.—State and prospects of crops as last week. Public health fair.

Mysore and Coorg.—Growing crops in good condition. Prices of food-grains stationary. Prospects of season and public health good.

Berar and Hyderabad.—Weather hot, with occasional dust-storms. Ploughing operations going on. General health fair, except in Asifnagar and Shahabad talukas, where cholera has appeared.

Central India States.—No more cholera in Residency. Weather warmer. Prices stationary. Cholera reported from Mhow; sudden outbreak amongst natives, but very few fresh cases; otherwise health good.

Rajpootana.—Weather seasonable. Prices stationary. Health good.

Nepal, April 30.—Weather cooler and more seasonable. Prospects moderate.

Letters to the Editor.

HOW TO KEEP OFF RATS FROM PLANTS.

I.

TO THE EDITOR.

SIR,—With regard to the method suggested by Baboo Hem Chundra Datta in your issue of the 9th instant, for getting rid of rats, will the gentleman or yourself oblige a large number of enquirers by giving the Bengali name of cowhage (*Mucuna pruriens*)?

AN ENQUIRER.

Midnapore, May 12, 1885.

II.

TO THE EDITOR.

SIR,—In reply to the letter of your correspondent "Enquirer," in which he asks to know the Bengali name of cowhage (*mucuna pruriens*), I beg to state that it is generally known to natives by the name of *al-kooshee* or *bandooria seim*. In the Mahratti language it is called *khajree kooiri*, and was well known to Mr. W. G. Betham, at one time an Assistant Conservator of Forests, Dharwar, for its beneficial effects in keeping rats and vermin from the roots of trees.

HEM CHUNDRA DATTA.

Raghoonath Chatterji's-street }
Malakar's Cottage, May 14, 1885. }

TEA AND HOPS IN THE KULU VALLEY.

TO THE EDITOR.

SIR,—In your issue of the 4th of April, I note an article anent the growth of tea and hops in the Kulu Valley. The writer says that cultivation does not seem to be very successful.

He apparently has not had an opportunity of forming an opinion, No one who saw the bushes at Dhobie, Raisou, or Aramgarh, would doubt its success.

In stating it as his opinion that hops will not grow under 5,000 elevation, he appears ignorant of the fact that the famous Golding hops of East Kent, and the Bines of Farnham are grown at a much lower elevation. In Canada and Cashmere, they are grown successfully below that height.

The adverse inferences your correspondent draws of the growth of tea, and hops, may be derived from the peculiarities of some particular locality, but are erroneous as applied to the whole of the Kulu Valley.

ÆGIS.

Editorial Notes.

THE Government of Madras have, we learn, accepted the suggestions of the Chief Engineer for Irrigation, that the Collector should arrange to take charge of all tanks in the Madras district, and submit revised proposals for watching the bank of the Mylapore tank when full. He will, of course, seek for the advice of the Public Works officers when any work requiring professional advice has to be executed.

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WE learn from a gentleman who has but recently returned from a district town that cattle are at starvation point in many parts of the Toomkoor and Shemograh districts. There has been no rain, and the pasturage having all been burnt off by the excessive heat, cattle subsist on the leaves of trees, and those which belong to the ryots living in the vicinity of the high road manage to keep alive by feeding on the ripe figs which fall in abundance from the avenue trees of the variety planted on the road. Even water is difficult to be had ; the small tanks have dried up long ago, and the bigger ones, which have bean traditionally said to never have been known dry, are fast becoming muddy deposits.

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THERE were seventy-eight collieries at work in Bengal at the end of the year 1883, the output from which was reported as 1,200,957 tons, and two in the Central Provinces (Mohpani and Warrora), from which 115,019 tons were raised This output compares very favourably with the average of previous years, but the next return ought to show a still larger quantity, as no mention is made of the new mines at present at work in Assam or of those which have been commenced in the State of Rewah. The number of persons employed in the mines in both Bengal and the Central Provinces is given as 23 172 ; but there is some doubt about this figure, as some of the returns are defective.

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THE railway coolies on board the *Jumna* must have been considerably puzzled. They were sent to Suakin to help to make the railway to Berber. Then, as the railway was abandoned, they returned to Bombay *via* Aden. At Aden the *Jumna* was countermanded, and ordered to return to Suakin, where, we are told, the coolies will be employed in making huts for the garrison. We suppose the explanation may be found in the urgency with which transport is now required. The *Jumna* is wanted for a more important cargo than coolies, and they will have to remain at Suakin, making huts, until in more leisurely times an opportunity occurs of bringing them back to Bombay.

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FROM correspondence courteously placed at our disposal, it appears that the Madras Government have experienced some difficulty in controlling the illicit manufacture of liquor by Khonds and Urya Sundis in the Pedda Kimedi, Chinna Kimedi, and Goomsur Maliahs. In all 28 abkari licenses were issued in the first named maliah during 1884, and the total amount levied was Rs. 112, each license being charged at Rs. 4. The licensing system has been introduced into the other maliahs, but with small success.

The Government are therefore of opinion that the orders forbidding distillation by Urya sundis, should be strictly maintained in force. From a revenue or social point of view, the so called illicit distillation is considered a matter of trifling importance, and must be tolerated if licensees other than Urya Sundis can not be obtained.

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MR. W. WILSON, the Director of Revenue Settlement and Agriculture, has addressed a letter to the Government of Madras, on the subject of fibre, and has forwarded some samples prepared at the Saidapet farm under the direction of the Agricultural Reporter to Government from the Manilla hemp-plantain (*Musa textilis*), and from the common plaintain tree (*Musa paradisiaca*), and has suggested that they be sent to the Secretary of State for India for valuation in the London market. He adds that he would have asked some of the local mercantile firms to have this done, had it not been that some time ago he was informed by one of the leading firms in Madras, that samples sent for valuation were valueless unless they were of considerable bulk—say, two or three tons. As, however, the Government Reporter could not conveniently supply a sample of this bulk, he thought a London broker would have no difficulty in appraising the value of fibre of the same standard of fineness by the samples he now sent.

A CEYLON contemporary hears that there is every prospect of a powerful association, to be called the Kelani Valley Planters' Association, being started very shortly, to include not only estates actually in the valley, but also those in Western Dolosbagie, if they will consent to join, which is very probable. A general meeting will be called early in May at some convenient spot, probably the Yatiyantota Rest House, at which all interested in the movement should be present to inaugurate the movement which is already assured of success by the support of all the most influential men in the district. We earnestly trust that the efforts of those who are striving to launch the undertaking will be successful, and that the Association may have a long career of prosperity before it. The present Association, too, stands in need of such help as the affiliation of another strong and powerful body will give it.

WE learn that Mr. P. Bosworth Smith has been appointed by the Secretary of State, on the recommendation of Professor Chandler Roberts, to the newly created post of Government Mineralogist in the Madras Presidency. The appointment will be for three years certain, on a salary of Rs. 500 per mensem, commencing from the date of arrival in India, with a travelling allowance of Rs. 250 per mensem, and a first class passage to Madras, but not a return passage. Mr. Bosworth Smith arrived in Madras by the steamer *Peshawur* on the 26th April. The duty of the new official will be to create, in connection with the Central Museum at Madras, a perfect index to the mineral wealth of the Presidency. The instructions issued to him are that he should, in the first place, go carefully through the collection of minerals now in the Museum, and subsequently travel to Ootacamund to confer with Dr. Bidie and such other officers as the Government may instruct him to communicate with, prior to engaging in a mineralogical survey of the Presidency, on which it is proposed that he should be employed.

A CONTEMPORARY, refering to the Presidency of Madras, says that it may be "benighted" in some things, but the Southern Presidency frequently sets the other divisions of the empire an axample in the direction of administrative activity. Madras has long had an Agricultural Department, which has done and is doing much good work in spite of occasional mistakes, such as the importation of expensive and unnecessary seed drills, noticed in last year's Madras Administration Report; it has also an active Archæological Branch ; and among other things, it is advanced in the important matter of village sanitation. We noticed the other day a scheme which has originated at Medras for distributing cheap medicines, especially quinine, amongst the poor population, and inducing the people to adopt the remedies placed at their disposal. Now, we notice another suggestion, which, if carried out, might not inconceivably have even a wider effect towards reducing the fever mortality—prevention being admittedly better than cure—than the utmost success to which the medical project could attain. The idea is that itinerant scavenging gangs of some half-dozen men each, under a jemadar, should be formed to go from village to village and thoroughly cleanse them, removing accumulated filth, digging pits in convenient places for the deposit of rubbish, levelling the streets, digging side drains, &c. It is calculated that every such gang would be able to give an annual cleansing to some 50 villages, and that twelve gangs, to cleanse 600 villages a year, would cost about Rs. 7,500, or Rs. 12 per village cleaned. Another suggestion is that village Moonsiffs should be empowered to levy small fines in punishment for nuisances committed in cleaned villages.

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DR. HENRY TRIMEN, of the Royal Botanical Gardens, Peradeniya, writes as follows to the *Ceylon Observer*, on the subject of Coca leaves from Ceylon (valued at 13*s.* per lb.) :—

As it has been stated that the few samples of coca hitherto sent from the East were of inferior quality, I have lately sent home a small quantity picked in the gardens here, with the view of ascertaining the real value of the Ceylon leaf.

A pound of fresh mature leaves was gathered; they were dried carefully in a current of dry air under a verandah, the process being finished off in the sun. This was in the steadily dry weather of last February. The leaves lost half their weight in drying. When finished (in 10 or 11 days), the samples was packed in a tin box and sent by post to Mr. T. Christy, of Fenchurch-street, for report. He has kindly sent the following information, which will be read with interest:—"You will be pleased to hear that Mr. Dillworth Howard has tested the coca leaves, and finds they contain 22 per cent of pure cocain, which is considered a very fair percentage. At present the cocain of Merck is selling here at 22*s*. 6*d*. the gramme; therefore, as a gramme of hydrochlorate of cocain is produced from a lb. of leaves, this would make the leaves worth in the market at the present time 13*s*., and leave a large margin for the maker."

This report seems to show satisfactorily that the leaves grown here yield a fair amount of alkaloid, and that prepared in dry weather without any special precautions, they will travel home in good condition. I, therefore, lose no time in making Mr. Christy's information public.

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A CONTEMPORARY says:—Famine seems to be the order of the day. While the Government and the public are co-operating together to tide over the crisis in parts of the Beerbheom district, news comes to us from Bankoora that "serious distress" has broken out in the Sonamuki thanna, in the Bankoora district. We publish the letter of the Commissioner:—

"With this office No. 46 dated 4th September 1884, Mr. Wilson submitted a report on threatened scarcity in parts of Baukoora. The scarcity was at that time rather apprehended than actually felt, and the Collector had at his disposal sufficient funds from various sources to meet all necessities, and no aid was asked from Government."

* * * * * *

"From the annexed sketch map it will be seen that serious distress is confined to a tract in the Sonamukhi thanna. Aid of an indirect kind is, however, required in a tract stretching to Indas and Kotulpore.

"The Collector's proposals are judicious, and I have already verbally signified my approval of them to him when at Bankoora. It will be seen that he estimates that it will be necessary to expend Rs. 12,000 on charitable relief. Of this he has already Rs. 4,000, and hopes to get Rs 1,000 more, so that an additional sum of Rs. 7,000 is wanted. I hope Government will be able to grant the whole, or a large portion, of this sum between this and September next.

"We are bound to say that the Government has not given a generous response. The sum of seven thousand rupees required by the local authorities has been granted, but in monthly instalments of one thousand rupees, probably in the hope (as evil-minded people may be disposed to think) that the whole of the amount may not be wanted. This is scarcely generous of the Government, especially after the absorption of the Famine Insurance Fund."

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THE Conservator, Southern Division, recently submitted proposals with estimates for extending the teak plantations at Nilambur in the Madras Presidency, by planting 100 acres annually for ten years. The plantations were to be treated as coppice with standards, the trees to be coppiced being teak, and the standards mahogany, planted 50 feet apart. The total cost of formation and maintenance for 10 years per 100 acres has been estimated at Rs. 7,800, or Rs. 10,656 with interest at 4 per cent to the end of the eleventh year, when a first return of Rs. 25,000 is anticipated. The produce of the plantations is to be devoted to the supply of teak poles for which the demand is very large, but possible objections on the part of the lessor will be fully met by leaving sixty saplings per acre to mature into forest trees. It appeared, however, to the Government to be doubtful whether seignorage will not have to be paid under the terms of the lease. The Board of Revenue will call for a report as to the grounds on which payment of stump fee for saplings has been hitherto refused, and as to the financial effect on the calculations of payment being made for them. Upon receipt of this information, the Government will be in a position to decide upon the matter.

THE testing of seeds for planting or sowing, to determine their germinating quality, is a matter of no little importance to the farmer or gardener. A writer in the *North British Agriculturist* gives a simple method of doing this, which he pronounces far superior to moist flannel or earth. He takes two flower-pot saucers, one smaller than the other, say one 10 and the other 12 inches in diameter, and lays his seeds to be tested in the bottom of the smaller one. This may be divided off by lines and several different kinds of seed placed in it at the same time, 100 seeds of each kind being placed in each division; the larger saucer is half-filled with water and the smaller one, with a pane of glass over it, is placed in it. They should be kept in a warm place where an even temperature is maintained. The water in the outer saucer will penetrate the loose porous material of the inner one, supplying all necessary moisture to the seeds, while the glass over the top will prevent evaporation, and maintain a moist warm atmosphere about the seeds. The number in each 100 which sprout indicates the percentage of seeds which can be depended upon to grow. As light is unfavorable to germination, it is well to paint the glass, or cover it with paper. The condition of the seeds can be ascertained at any time by simply lifting the glass, and no care is required beyond keeping the larger saucer supplied with water.

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A CONTEMPORARY, commenting upon the recent exhibition of ploughs at Ootacamund, says:—The fair amount of success that attended the exhibition of ploughs and the ploughing matches held at Ootacamund some months back under, the auspices of the popular Collector of the district, induced the authorities to notify that another exhibition and a few matches would come off in April or May. It appears, however, that the notice issued for the information of the ryots and the badagas, did not meet with a favourable reception. Few if any of them applied to exhibit their ploughs and other agricultural implements, and it has been decided to put off the show for a little time. It is to be regretted that these occasional shows cannot be held in the district in accordance with the arrangements made by the revenue authorities. We have ample evidence in the reports issued by the Agricultural Department, that these exhibitions and ploughing matches have done some good, and that many of the better classes of ryots have begun to use cheap and improved descriptions of ploughs. The ploughing matches in the Nilgiri district may, as time passes, induce the Badagas to push forward agricultural work and grow barley and other descriptions of cereals which were once available in the district, but have now almost ceased to receive attention, and consumers are consequently dependent upon importers for the article. A small exhibition of implements, especially at the time when the Government is on the hills, and when the whole official world is up "in the clouds," may be productive of good results, and induce the Badagas to make improvements in the cultivation of the soil which, from all accounts, is gradually and steadily deteriorating.

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THE following is the result of the last examination of students at the Royal College of Agriculture, Cirencester. It will be observed that the names of two Bengali students occur as having gained diplomas, while one of them is 'honorably mentioned':—

DIPLOMA (Maximum marks, 2100; qualifying marks, 1400)—Cecil George Freer Thonger, Lords, Wood Road, Harborne, Birmingham, 1946; Bhupal Chandra Basu, Bengal Government scholar, 1905; Charles Albert Curry, R malho, Mulgrave Road, Sutton, Surrey, 1721; Atul Krishna Roy, Bengal Government scholar, 169 ; Harry Gilbert Henderson, Dunholme, The Park, Cheltenham, 1681; Jas. Mitchell, Gibb, Vere, Jamaica, 1671.

DUCIE GOLD MEDAL,—Cecil George Freer Thonger.

SCHOLARSHIPS.—(Open to the whole college. Maximum marks, 2000; qualifying marks, 2500)—First scholarship, Alfred Denis Faber, Barrow Lodge, North Devon, 2874; second scholarship, William Timothy Hall, Vinter's Road, Maidstone, Kent, 2810.

The following deserve honourable mention in order of merit—(qualifying marks, 2500):—Mukerji, 2747; Dickson, 2720; M'Donald, 2672; Andrews, 2669; M'Minnies, 2668; Chavasse 2658; Carrington 2630; Davies, 2627; Cave, 2620; Perkins, 2600; Bailey and Dudley, æquales, 2583; Scott, 2581; Taverner, 2567; Rennie, 2547; Lugard, 2517.

The Principal afterwards pointed out that Mr. M'Donald had gained the diploma of the Highland and Agricultural Society. Referring then to the sessional work by the different professors, Mr. M'Clellan paid a very high compliment to our countryman, Professor Wallace, who had been a most successful and popular teacher in the college.

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We have received a copy of the correspondence regarding a trial made of Indian wheat in South Australia, the Royal Agri-Horticultural Society of which place was supplied with a sample through the agency of Mr. H. J. Scott, who represented South Australia at the Calcutta Exhibition. The Secretary of the Society has now reported to the Government of India the results of the sowings made, which bring to light some important facts. The yield per acre is stated to have been 24 bushels, or nearly 18 maunds. This is rather an exceptional yield, when compared with that of American and Indian wheat generally. The yield per acre of the former in its native soil has been estimated at an average of 19 bushels, while that of Indian wheats, when grown on lands of average good quality, manured and irrigated, in the N.-W. Provinces, where the yield per acre is highest, was found to be at the rate of 22 bushels to the acre. The importance of the results obtained in the South Australian experiment will be better understood from the fact, as stated by Professor Custance, who made the experiment, that "the wheat was sown broad-cast on about one rood of *poor unmanured ground.*" The italics are ours, as we wish to draw particular attention to this point, which is of considerable importance.

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If on "poor unmanured" soil the Indian wheat yields at the rate of 24 bushels per acre, which exceeds the yield of wheats grown in America and India on good, manured soil, how much greater must its yield per acre be when sown on soil of good quality? The inference we draw from this experiment of our Indian wheat in South Australia is, that the conditions for its growth and productiveness are far more favourable there than they are either in India or America. Professor Custance adds in his letter reporting the result of his experiment, that he intends making further sowings of this wheat on good soil, with the object of procuring seed for distribution next season. The result of this experiment will be looked forward to with much interest, as Indian wheats are attracting a great deal of attention just now.

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We have received from the Bengal Secretariat copy of a correspondence which has passed between the local Government and the Commissioner of the Burdwan Division on the subject of the distress in Baukoora. So far as the 4th September 1884, Mr. Wilson, the then Officiating Commissioner, had submitted a report to the Government of Bengal on the threatened scarcity in that district. The Collector, however, had at his disposal certain funds derived from various sources to meet impending necessities, and Government aid was not asked. Since then assistance was given principally in the shape of grants from the Road Cess for village roads, which gave work to those in the distressed tracts. People who were too weak to work were supported by charitable relief. In February last Mr. Beames held an interview with Mr. Tayler to concert measures necessary for the future. In accordance with the instructions given by the Commissioner, the Collector instituted enquiries and embodied their result in a letter to him, dated the 24th of the same month. The information contained in it being insufficient, a second letter was called for, in which the Collector states "that the number of persons requiring gratuitous relief in the jurisdiction of the Sonamukhi and the Gangajalghati thannahs is 1,275; of this number 278 are children, 689 men, and 308 women. Most of the men and more than half of the women are incapable of physical labour by reason either of old age or disease, the rest of the women being *purda-nusheen*. The cost of feeding this number, allowing two pice per diem for each adult, whether male or female, and one pice for each child, would be about Rs. 2,000 per month," as the next rice crop will not make its appearance in the market till the end of September, a sum of Rs. 12,000 will be required between April and September. The Collector has in hand Rs. 4 000 raised by private subscriptions, and he expects a further sum of Rs. 1,000 from the same source. The Government have therefore been asked to contribute the balance, Rs. 7,000. The Magistrate proposes to send for paddy from Midnapore where it is cheap. This will not only give relief to a large number of cartmen who are without work, but the women who are prevented from appearing in public might be induced to husk the paddy at their houses, at the usual rate of two seers of rice for every 20 seers husked, and thus be relieved of the necessity of looking to charity for support. The Collector recommends that the rice be distributed raw, as it will ultimately effect a saving of Rs. 900 a month, and no useful purpose would be served by issuing it cooked. These proposals of Mr. Taylor were accepted by Mr. Beames, and recommended to the favourable consideration of Government. The Lieutenant-Governor, while approving of the suggestion, thinks it best not to grant the entire sum of Rs. 7,000 at once, "but he will place a sum of Rs. 1,000 each month at the Collector's disposal for that purpose. Should, however, a larger share of the Rs. 1,000 be wanted in any month, this requisite amount will be granted on due representation being made to Government."

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A good deal has lately been written on the subject of tea fermentation, upon which there is much diversity of opinion. The following letter addressed (by an expert evidently) to the *Ceylon Observer*, throws some valuable light on the subject :—

There has been much disputation upon whether "oxidization" should not be substituted for the term we usually use as "fermentation" in the manufacture of tea. Under any circumstances I should say that ferments would be discovered as present in this process, and it is furthermore undoubtedly the first stage towards decay, unless we may consider decay as beginning with the wither. There is a great deal in the term "decay," and this appears to be more implied by the expression "ferment" than by oxidization, although some are very much inclined to believe the change in our tea is as much owing to the *former* as the latter. Whenever mere water, saying nothing of decomposing compounds, such as tea after rolling, has first been boiled to destroy animal and vegetable life, and then exposed to the normal atmosphere, it has always succeeded in filling it in a very short time with life, and, as far as I have studied the subject, this is even the case with tobacco water, a very certain destroyer of insect, and I may say all vegetable matter.

Inorganic compounds never of themselves ferment as far as the correct meaning of that word applies. Chemical change may take place, heat may be produced, and oxygen very frequently comes into active play. With organic compounds oxidization of course takes place, but this most probably in conjunction with ferments. I should think the germs of fermentation are usually first contracted during the wither and develop themselves after the roll. Fermentation and decay of course mean the absorption of a deal of oxygen from the air, and is very much affected by the slight addition of water. Excessively fermented tea becomes sour, indicating I suppose the change of some of the sugar, starch, or tannin into active acid. The production of acetic acid has, however, recently been called oxidization and not fermentation.

Fermentation correctly, I conclude, means the presence of another influence acting upon the tea, or whatever the substance be, as yeast upon beer, or gluten upon sugar. In organic properties, however, it must be very difficult to determine how far the germs of the atmosphere act upon our decomposing tea, consisting as it does of all the necessary elements to produce fermentation quite as much as oxidization, both gluten and sugar being present.

It would be very interesting if some one who can treat the subject more fully would take it up, for it is many years since I studied these subjects.

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A few weeks back we noticed the new steam tea rollers recently brought out by Mr. Jackson to Ceylon. The following letter, addressed to the *Ceylon Times* by a correspondent, gives the result obtained from experiments made with Sirocco and Jackson's hand-roller, which may prove interesting to many of our readers :—

I noted in your issue of the 28th ultimo a letter from Mr. C. A. Hay, of Blackwater, Nawalapitiya, on tea drying by siroccos. I note he got 30½lb. made tea per hour from No. 710 old style sirocco, with charge of 9lb. fermented leaf per tray. I have just made a careful experiment with mine, No. 637, old style, with a charge of 7lb. fermented leaf and a mean temperature of 283°. I got 34 lb. made tea per hour (I find that I get more per hour with a 7lb. charge of fermented leaf per tray than 9lb. or more) I never turn my tea, only level tea, as the third tray is drawn out before placing in fourth slide.

I promised you the results of Messrs. Jackson's hand tea roller made by Messrs. John Walker & Co., Kandy, in January last. This roller cost Rs. 475 nett. It is fitted with pulleys, circular cross action bars of box, also 4 on each side under base sliding plate of table, which decidedly makes work lighter, as I found by trying it at first by mistake without the pulleys. Since I have had the machine I took off the hopper fixed on top of box and deepened the box 6". The original size of box when received was 14½" high, 16½" wide each way; increase. 6"—present size of box 20½" 16½". (The measurement given is outside; the correct for inside is 19½" by 15½") The box as first received rolled about 50lb. withered leaf; now it will roll 85 lb. viz., experiment on 3rd April 1885:—1st roll 85lb. withered leaf in 1 hour; 2nd, 76lb. withered leaf in 1 hour; or 161lb. in two rolls in 2 hours or 229lb. green leaf in 2 hours. This was rolled by 4 coolies, 1 coolie tending; total 5. On 19th March, it rolled 566 lb, green leaf in 5 rolls with 6 coolies; on 2nd April 419lb. green leaf in four rolls with five coolies; that is, 4 coolies rolling, 1 coolie tending leaf. When the quantity of leaf required over two rolls, one or two coolies extra are taken on to spell the other.

I feel sure when this machine is connected to water power it will roll in half-an-hour or three-quarters of an hour the same quantity of leaf better than with hand power in one hour. I would note that the leaf even with the large quantity of 85 lb. was very well rolled —quite as well as done by the Universal, from which so far I have only been able to get from 50 to 60 lb. of leaf well rolled.

I have deepened the box of the Universal 6", but as yet have not been able to see how it acts, as I have not water sufficient at present to work it. When I deepened the box of the hand-roller I increased the weights by 7lb. each side, or 15lb.

I will let you know how the Universal roller works with the increase in size of box as soon as I have water sufficient to work it—streams are lower this year than ever I have known them before.

I have made Jackson's sifter do everything. Never use a hand sieve. I have additional sieves to fit in on top, deck on deck, in fact a four decker. It does its work very well indeed: takes both dust and flat tea out etc., etc. What will Jackson say?

Theberton work of Sirocco No. 637 in one hour from 10·30 to 11·30

Time of trays put in Sirocco.	No. of trays.	Time of trays dried.	Temper-ature.	Remarks.
10 30	1	10 45	270	Each tray had 7lb of fermented leaf.
10 30	2	10·50		
10 31	3	10 55	up to	Temp. of Sirocco did not exceed 300. Sirocco fired for the hour 34lb dried tea.
10-31	4	11·		
10-47	5	11·5		
10·51	6	11·10	300	
10 54	7	11·15	fell to	
10-58	8	11·20		
11 04	9	11·25		
11-09	10	11·28		
11-13	11	11·30	280	

77 lb. fermented leaf made 34lb. tea in an hour.

Note—In a trial I had on the 2nd, I got 86lb. fermented leaf done in the hour, but the 77lb. in this trial was more carefully done.

REPORT OF THE DEPARTMENT OF AGRICULTURE, WASHINGTON, FOR 1884.

We are indebted to the courtesy of the Commissioner of Agriculture, the Hon'ble G. B. Loring for a copy of this very interesting report. It is divided into seven parts, consisting of separate reports by the Chemist, the Botanist, the Chief of the Forestry Bureau, Chief of the Bureau of Animal Industry, the Entomologist and the Statistician; and the entire working of the department is summed up in a report by the Commissioner himself.

We thus find that the Bureau of Animal Industry was only established in May 1884. Its sphere of duties embraces a wide range, and comprises (1) investigations in regard to the extent, nature, and means of combating outbreaks of communicable diseases among domesticated animals of the country. (2) Scientific investigations in regard to the nature and cause of contagious diseases among animals, coupled with microscopic investigation of American pork to prove the existence of trichinous infection. (3) Development and need of the various branches of the live-stock industry. (4) The practical direction of the guaranteed system, which now forms one of the duties of this bureau. In fact, to use the words of the Commissioner, "the labour of this bureau has been directed to prevent and control communicable diseases among animals in this country, to prevent the importation of such plagues from abroad, and to collect such information as is valuable to the stock grower, and necessary to the profitable development and conduct of our animal industries, and to enable us to secure free entrance for our animal products into the markets of the world."

The Bureau of Statistics is a very important one indeed. The extent of its labours may be gathered from the fact that, in addition to the special agent in London who reports upon the trade and industry of Europe, there are *ten thousand* correspondents in this department in the country, who furnish the materials for the statistical estimates of the bureau, which has been active during the year in the work of collecting the official statistics of State departments, boards of agriculture and commercial organizations, exploring the domain of fact in all departments of agricultural effort and experiment, and railroad transportations.

The work in the Bureau of Botany has, it is said, been "prosecuted with vigour." Much useful work in the way of distributing plants, seeds, fruits, grasses, &c., and answering enquiries from correspondents, has been done. This is a branch which, in its separate report, abounds in some very interesting information, but being very technical, we shall at a future time consider separately.

The Bureau of Chemistry forms an important feature in the report. It had under investigation the following work—(1) study of American cereals, with reference to the composition of the grains, their relation to moisture, variation in size, &c., as influenced by environments. (2) Study of the "Roller Milling Process" for the manufacture of flour—the results comprising both a physical and chemical examination, which are considered of great interest. (3) Baking experiments with flours of different grades from all parts of the country. (4) The examination of American dairy products; some of the results are to be found in the report of the Chemist, which will be noticed in future articles. (5) Extended investigation of maple sugars and maple syrups, which tends to show the presence of numerous spurious adulterations to be found in the market. (6) An investigation of soils, with a view to their exhibition at the New Orleans Worlds Cotton and Industrial Expositon. (7) A study of the sugar industry of the country, including experiments and practical work with Sorghum, and an examination of the status of the beet sugar industry on the Pacific coast. The labours of this bureau are fraught with interest, and we purpose, at a future date, to write more fully on this point.

The Bureau of Entomology has continued in its various lines of usefulness. Important discoveries have been made as to the insect destruction of forest trees, as well as cereals, and fruit trees. An important feature in this bureau is that while preserving the scientific nature of its researches, it has sought to bring the results of its labours within the comprehension of average readers, by eliminating from its reports such technical descriptions as would not be appreciated by the mass of intelligent farmers. This is a point upon which we lay much stress, as it is too often lost sight of in the no doubt creditable endeavour to produce strictly technical and scientific reports. This is a weakness most observable in the reports received by the Government of India from its provincial administrators. This bureau has had under consideration the subject of the phylloxera, the promotion of silk culture in the United States, and the distribution of literature, silk-worm eggs, and mulberry trees to all such as may apply for them.

The investigations of the Forestry Bureau bring to light some alarming features of this industry in the Northern States. Much was done in the way of eliciting replies to circulars regarding parts of the country deficient in natural growth of trees. Instructions were printed and distributed in the best plan of planting, to avoid the mistakes and consequent losses which so often discourage the planter. The agents of the bureau have made personal observations in regard to the growth and preservation of forests. Their labours in this direction have been attended with more or less success. But official returns showed a steady diminution of forest area. The great pine forests of the north-west are said to be depleted to an alarming extent, but efforts were being made to guard and protect them.

We have gone carefully over this report, and have seldom perused a Government production of more interest. While maintaining its official stamp, it is full of instruction, and has repaid a perusal of the varied and interesting information it contains. It is thoroughly practical in all its parts, and there is an air of masterly handling in all of its departments, without superfluity. We would invite the attention of the Government of India to this volume, and would suggest that a report on the lines adopted by the Department of Agriculture at Washington, might with much advantage be brought out in India. If the several departments of the Imperial and Provincial Governments would embody the vast information they obtain *annually from their district officials*, into a handy and popular form such as that we have before us in the report of the Washington Department of Agriculture, it would, we think, go a great way in bringing the mass of valuable information within easy reach of all classes, and thus give an impetus to the study of important subjects in domestic and political economy.

We propose extracting and giving to our readers from time to time selections from the report of such matters as we think will be of interest.

AGRICULTURAL DEPARTMENT OF BENGAL.

(Continued from last week.)

IN respect to the larger subject of *Agricultural Improvements*, it is not considered possible or expedient to lay down any exact rules; the Director's official duties in this respect being, for some time to come, limited to observation and experiment. Some of the subjects to which his attention may be usefully devoted are enumerated in the Lieutenant-Governor's letter of June last; but as the department at present exists on the basis of a provisional sanction, it is considered better to trust in this branch of the subject, to useful action in concert with established Societies (such as the Agri-Horticultural and Zoological) interested in the matter; and to the employment of the Cirencester graduates who are at the disposal of Government, rather than that the Director should rely solely on his individual exertions. In this view, arrangements have been entered into with the Agri-Horticultural Society, by an increase in the Government subsidy, by which its active co-operation in aid of the Agricultural Department has been secured.

Among the miscellaneous matters that are to engage the attention of the Director, is the important one of the prevention and cure of diseases among cattle; for nothing tends more to stability and progress in agricultural operations than the preservation and improvement of cattle, upon whose labour agriculture in India so largely depends. Therefore fodder for cattle and fuel for the people will take up a large share of the Director's attention. To extend the usefulness of the Indian and Economic Museums, in communication with the Government of India, will fall within the province of the Director of Agriculture, who will also be usefully employed in connection with exhibitions in India and in foreign countries, where it is of the utmost importance that the great natural and industrial resources of Bengal should be fully represented.

With regard to the employment of those graduates of the Cirencester Institute who have returned to India, it is proposed to utilize their services in such a way as suggests itself to be the most useful. Thus agricultural enquiries are for one year to form the main object of their attention, their other duties being regulated accordingly. They are to make themselves thoroughly acquainted with the *native* systems of agriculture in selected localities, where it may be found possible to introduce improvements. While engaged in this work, these officers are requested to secure the active assistance of members of the native community interested in agriculture. In this connection the Lieutenant-Governor lays much stress on the co-operation of officers of the Opium Department in Behar, as they are engaged in duties which bring them into intimate relations with the agricultural population. For this purpose, the Board of Revenue will issue the necessary instructions. Committees of European and native gentlemen are to be formed, who might interest themselves in getting up local exhibitions with the advice of the Director. The Lieutenant-Governor will be prepared to make reasonable contributions towards the expenses of such exhibitions from Provincial Funds.

With reference to agricultural experiments, it is pointed out that officers desirous of testing the merits of agricultural implements, should make the trials on the ryot's own grounds as far as possible. This is a move in the right direction; as the cultivator is more likely to adopt the new method under these circumstances, and more practical good may be expected from such experiments, "than," as Sir Rivers Thompson correctly remarks, "if the experiment had been tried on a model farm, and the results recorded in blue books." It is further stated, in regard to this importont point, that the people will not be induced to try experiments in this way unless Government are prepared to make good any losses they may sustain by following its advice. To this end, the Lieutenant-Governor will be prepared to make, in a moderate way to begin with, an allotment of funds to meet such contingencies.

With the foregoing general directions, the charge of this important department has been placed in the hands of Mr. M. Finucane, who is an officer of much experience in this particular department. He has for his assistants three able officers, *viz.*, Mr. D. B. Allen, C. S., Mr. Ambica Churn Sen, C. S., and Mr. Sakhawut Hossen, Deputy Magistrate and Collector. Messrs. Allen and Sakhawut Hossen will be employed in Behar, and Mr. A. C. Sen in Bengal (possibly Burdwan). In regard to *Agricultural Research*, the Director will be under the control of the Board of Revenue; while in reference to *Agricultural Improvements*, he will be under the orders of the Revenue Department of the Secretariat. But he is at liberty to communicate direct, on all subjects, with local officers and heads of Depart-ments. Such, in brief, is the programme laid down at present for the Director of Agriculture. We have no comments to make upon this measure, beyond this, that it has been a matter of surprise to us that the most important agricultural Presidency of the Empire should have been so long without such a department. The choice of the Lieutenant-Governor in the selection of a Director has happily fallen upon a gentleman who may be expected to grapple thoroughly with the vast field of enquiry opened out before him. We shall therefore await with interest Mr. Finucane's first report of his labours in the Agricultural Department of Bengal.

AEROLITES.

THE attention of the Government of India having been recently invited by the Superintendent of the Geological Survey of India to the subject of reports of falls of aerolites, Loca Governments and Administrations were consulted as to the expediency of reviving the existing orders in those Provinces in which they had to some extent fallen into desuetude, and of extending them to other provinces. The replies received being favourable to the proposal made by the Superintendent, the Government of India directed that the orders issued in 1866 on this subject should be considered of general application. Col. Oldham, the then Superintendent of the Geological Survey of India, submitted a proposal for the approval of his Excellency in Council, that instructions might be given to the Local Governments, &c., that all falls of aerolites, together with the papers relating to them, should, in the first instance, be forwarded to the Government Geological Museum, Calcutta, and that at the same time orders should be given to the Director of the Museum that specimens of all such falls should be forwarded without delay to the British Museum, with all particulars as to the date, &c., of the fall. In fact, that this Museum should be made the medium of transmission of such specimens to the British Museum, with which we are in constant communication, and with which we have established a system of mutual exchange. By the adoption of this plan, the "Indian Museum" would not be deprived of the many opportunities of adding to its valuable collections of Indian aerolities, while the British Museum would be more certain of receiving good specimens of all that come to Calcutta. The following note on the Observation and Collection of Aerolities which contains the instructions referred to above, was drawn up under the direction of the Trustees of the British Museum in 1863, and circulated by Government in 1866 :—

There are two varieties of aerolites, or meteorites, that have been seen to fall from space. The one consists of stony masses, often containing particles of iron ; and of these many have been observed in their fall ; the other variety is composed, for the most part, of iron. The actual fall of iron aerolites has been but rarely witnessed, though many masses of metallic iron have been found on the earth's surface, of the meteoric origin of which there can be no doubt.

It is a matter of great interest and of importance to science that as many as possible of these bodies should be collected for comparison, and that all the circumstances accompanying their fall be carefully recorded ; and persons who, in the event of a "fire ball" being seen, or of a mass having fallen in their neighbourhood, will carefully collect facts regarding them may make a very valuable contribution to the science.

For this purpose, inquiries should be instituted at once into the circumstances accompanying the fall of any meteoric mass, and into the state of any such mass, when it has fallen ; and as regards any meteoric appearance in the sky, it will be found advisable, after noting carefully the point in the heavens at which the meteor made its appearance, to give, as accurately as possible the direction of its track and the point at which it disappeared.

Where it is possible this track should be delineated on a diagram.

The points to which especial attention is invited are enumerated in the following two series of inquiries :—

The first series relates to meteoric phenomena in the heavens, and their association with the fall of aerolitic matter to the earth.

1. Note the exact position of the observer, according to latitude and longitude.

2. Give the hour, day of month, and year.

3. Give the apparent size of the luminous ball, as compared with the full moon.

4. Its shape ; whether round, pear-shaped, or otherwise ; and, if elongated, in what direction.

5. It is particularly important to note the place where the meteor is first seen like a star, and from which, as it moves, it may appear to be increasing in size.

6. State the duration of the phenomena ; and

7. Whether the ball again dwindles away to the semblance of a star, and then disappears, or whether it retains to the last its full size, or then, as is often the case, divides into several balls or stars.

8. Give the colours.

9. Record any facts that can be gathered concerning detonations or noises accompanying the other phenomena.

10. Endeavour to collect statements relating to the actual fall to the earth of any solid bodies.

11. Do they consist of stone, or iron, and is there anything peculiar in their structure ?

12. Was the body red-hot, or warm, or did it exhibit evidence of having been warm outside and cold within—as, for instance, by being hot at first and intensely cold afterwards ?

13. It is desirable, further, to notice the depth to which, and the direction in which, the aerolite has penetrated the earth : also to state the nature of the soil, the effect produced on it by the aerolitic mass, and the position in which the aerolite was found to be laying in the ground.

The second series of inquiries has for its object the acquisition of a more precise knowledge regarding the aerolites themselves. For this, it is important to preserve, and to collect, for the purpose of analysis and of scientific comparison, as many of these bodies as possible ; and the following suggestions are offered in the hope of promoting this object :

1. Endeavour to get the meteorolites as soon as possible after their fall, to prevent them from being injured, fractured, or wetted.

2. If not entire, try to procure fragments.

3. Should persons or Museums not be willing to part with them for the British Museum, then procure drawings, photographs, models, or casts ; accompanied by an accurate description of their colour, the external lustre, and, if broken, the nature of the substance or substances exhibited by the fracture; and especially be careful to describe the form of the aerolitic mass, whether angular or rounded, whether prismatic, or otherwise exhibiting an approximation to any geometrical figure. Also state whether its surface be smooth, or marked by any peculiar kind of roughness, or pitted with hollows.

4. Catalogues of the meteorites in the local museums are very desirable, with statements of their weights, and also the time of, and other facts accompanying, their fall, as detailed above.

5. From masses of iron or stone still lying on the earth, and too large to be brought away, detach specimens of good size, say from 20 lb. to 50 lb. weight, and collect all obtainable information, with detailed descriptions, drawings, measurements, historical accounts, &c.

6. Iron meteorites should always be cut with a steel saw and emery.

The collection of aerolites in the Mineral Department of the British Museum is now, as regards the mass and size of the specimens the finest in the world, and any person who may be in a position to contribute additional specimens is requested to accompany them with an attestation as to the weight of the specimen, and facts regarding it such as the senders may be in a position to state on their own authority, or as may have come to them on authority which they have reason to accept as reliable.

Miscellaneous Items.

During the month of March 624,271 cwts. of wheat, valued at Rs. 25,14,488, were shipped from ports in Sind.

We hear that "foot-and-mouth" disease has made its appearance among the pack bullocks recently purchased by the Commissariat Department.

About 90,000 pilgrims paid the mela tax of one anna at Hurdwar this year. The total number who visited the place is put down at 120,000 persons.

During the thunderstorm on Friday morning last, week the house No. 17, Camac-street, was distinctly struck by lightning. Fortunately no casualty took place.

A correspondent informs us that the number of decisions *reversed* on "revision," which go up from the Lucknow Court of Requests, is abnormally high now-a-days.

During the storm and heavy rain of Friday last at Serampore, at the house of Baboo Poran Chunder Singhee, Mooktiar, a cow was struck dead by lightning, and a man slightly wounded.

It is rumoured that the Forest Accounts Branch in the Comptroller-General's Office will be abolished, in consequence of the late notification of reductions in the several departments under Government.

The Annual Horse and Dog Show, with which the Lancers associate themselves especially, comes off on Thursday and Friday near the 17th Lancers Horse Lines. The programme is a very "fetching" one indeed.

A correspondent writes that he hears from a reliable source that the members of the Executive Council, and the Secretaries and other officials to the Government of India, will return to the Metropolis this year, at the end of August next.

We hear that Mr. Ozanne, head of the Agriculcultural Department, was robbed a few days ago at Lanowli where his office is at present stationed. A valuable watch and chain and some other ornaments were stolen from his tent. The police are inquiring into the matter.

People seem to be flocking into the town seeking relief, and not only in Calcutta itself, but also in many parts of the suburbs. In Mooktaram Baboo's-street, hundreds of poor assemble daily for the purpose of obtaining relief in the chuttrum of Raja Rajendra Mullick Bahadoor.

Rain, we hear, is much needed both at Coonoor and Kotagiri. The coffee blossoms, which shot out freely a short time ago, are all being scorched for want of a few showers of timely rain. Tons and tons of coffee are thereby being lost. A bad look-out for planting interests this season.

WE hear that Mr. H. L. F. Fowler, a graduate of the University of Oxford and a son of Mr. J. T. Fowler, Inspector of Schools, Presidency Division, has been appointed Head Master of the Government Madrissa-i-Azam, which institution has been raised to the standard of a High School.

MR. ANDERSON, Veterinary Surgeon, Assistant Superintendent, Horse-Breeding Operations, Punjab, has obtained sixty days' privilege leave. His duties will be conducted during his absence by Mr. B. L. Grover, Superintendent of Horse-Breeding in the North-West Provinces and Rajpootana.

WE hear that some philanthropists in the city are organizing a committee for the relief of those persons who have been made homeless by the scarcity in Burdwan, Beerbhoom, and Bancoorah. They propose to help the distressed adequately, and will visit every house in succession with a subscription list in hand.

THE week before last a fire broke out in the village of Parovies, thanna Avosgram, district Burdwan. Nearly half of the village was burnt down and many poor people of the place have become houseless.—By a recent fire, 446 thatched and brick-built houses were destroyed in Mooktagacha, but fortunately no lives were lost.

A CONTEMPORARY hears that Mohunt Rugnath Das of Jaintpore has signified his intention to present the town of Mozufferpore with a fire-engine. The inhabitants have every reason to be thankful for the generosity of the donor, considering their recent heavy losses through fires. We hope the noble example will be largely followed.

THE total number of dogs killed within the Civil and Military station of Bangalore during the month of April last was 129, at a cost of Rs. 35-6, which was defrayed by the Station Municipality. The total number of cobras killed within the past month was 33. The destruction of these reptiles cost the Municipality of the Civil and Military Station Rs. 12-12-0.

VISITORS to Cashmere will be glad to learn that the Maharaja has had rest-houses erected at all the stages between Bhimbar and Srinugger, and a supply of mules and coolies are kept at each stage. The enterprising Khansama of the Gujrat Dak Bungalow has also established a hill cart service between Gujrat and Bhimbar, *en route* to Cashmore. The fare is Rs. 11 per seat.

DRINKING water has become so scarce that people in the Bangalore Cantoment can only obtain a small supply of it daily, as people at home and other places obtain soup, by tickets. The Shoolay tank is completely dry, with the exception of a small puddle which the natives render thoroughly unfit for use by wading into it for the purpose of catching fish. This could easily be prevented by placing somebody there on guard.

WE still continue to receive unfavourable accounts regarding the prevalence of cholera in the Presidency districts. In the sub-division of Bood-boodh, the disease continues to commit fearful ravages. The local Moonsiff has applied to the higher authorities for an order, either to close his court for a fortnight, or to remove it to Mankoor. Want of pure drinking water is much felt by the people. All the tanks and wells are drying up.

OWING to the large quantity of cattle bought up by the Commissariat Department for transmission to Quetta, the price of this article of diet in the local market has risen two-fold, while the quality has deteriorated in an equal degree. It is thought that if the present demand continues much longer, the Indian substitute for the Roast Beef of Old England is likely to become as precious as the gammon of bacon hung up in Irish households for show.

THE 24th of April was a day which will be long remembered in Vizianagram. The heat from 10 A.M. to 4 P.M. was intense and altogether unbearable, after which there was a terrific sandstorm which lasted for about an hour, pouring in columns of dust everywhere. When the storm had somewhat abated, it was followed by a smart shower of hailstones, each about the size of a sparrow's egg. Thatched buildings and trees suffered considerably, particularly mango topes, some of them being literally stripped of all their fruit.

A FIRE broke out lately at the Manockjee Petit Mill at Tardeo in the stores department, where a quantity of unpressed cotton bales were kept. On the fire being discovered the mill labourers were set to work at the fire-engines on the premises, and in a short time they succeeded in extinguishing it. The loss sustained is trifling —not more than Rs. 500, it is said. The public fire-engines were brought up quickly to the spot, but they were not used. Superintendent Crummy and other European police men rendered valuable assistance in extinguishing the fire, which is attributed to spontaneous combustion.

A *Kutchee*, not far from Poona, had a crop of melons, and, owing to several cases of theft from his field, he kept watch during the night. The other night he observed some one crawling towards the bed, evidently with no honest intention. He allowed the man to approach within arm's reach, and suddenly leaped upon him. In the struggle which ensued, the thief, a ramusi, was joined by four others, who maltreated the owner of the melon-bed so severely that the man expired a few days after in the Sassoon Hospital. They were brought into Poona lately, and will most probably be tried during the present Sessions of the Sangaum Court.

Selections.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary General Meeting was held on Wednesday, the 29th April, 1885.

COMMUNICATIONS.

Application from Messrs. Vilmorin, Andrieux & Co., Paris, for seed of the Patna Opium Poppy. Complied with.

From Dr. Bonavia, Etawah, asking for information regarding the "Gilla." He writes —

"Dhobis up here, and probably also down in Bengal, use a curious kind of *nut* for crimping linen, without using any crimping irons. This nut they call in Oudh 'Gelha,' and here 'Chian,' the latter means a seed. They say it is brought from Bengal and sold in Cawnpore. The pods are long and many seeded, and the seed is of the size of a small and *fat* pocket-watch, of a horse-chestnut color, and with highly polished sides. Dhobis cut one side, and scoop out the kernel; then they introduce two fingers into the cavity, and quickly strike the damp linen forwards with its polished surface. This crimps it beautifully *crossways*.

"I believe you have in the hills east of Bengal, some kind of Acacia which produces a long broad pod, with this seed in it. Can you kindly give me the botanical and local name of it, from the above description?

"A new interest attaches to this 'Gelha.' A lady took one with her to England, to crimp her child's linen, 'Dhobi-fashion,' and shewed it to Mr. Ruskin. He has undertaken, I am told, to set up a village with work people using nothing but primitive implements. He was so interested in this primitive Indian crimping machine, the 'Gelha,' that I fancy he has some idea of adopting it in his primitive village. The upshot is that I have been given the task of finding out the *botanical* name of the tree which bears this interesting crimping implement. It is very efficient. I know the seed, and have seen it used, but have not its botanical name. If you can kindly help me in this matter, you will oblige me, and will confer a favor on Mr. Ruskin."

The Deputy Secretary stated that the seed to which Dr. Bonavia referred was that of the Entada Scandens (Bentham) E. Pursætha (D'C) the Mimosa scandens of Linn. and Roxb., a large climber common to many parts of the Tropics and found in Sylhet, Nepal, Ceylon, Java, the West Indies, &c. The Hindustani name *Gilla* appears to be commonly used, but it has many other names, *Uriya* Geredi, *Nipalese* Pangta, *Bombay* Gardal, *Ceylon* Mahapuswela, *Tel* Gila-tiga.

According to Royle (Illus. of Botany of the Himalayas, Vol. I, p. 183) the seeds are used by the natives for washing the hair, and *Voight* (p. 256) says by the ghaut people as an antifebrile. Drury mentions that it is employed as an emetic in Java. The seed is made into snuff boxes in the West Indies, and according to Dr. Birdwood (Cat. of Vegetable Products of Bombay Presidency) "the pods are used by the police there." Although the pods are of great size sometimes 6 feet and more long and 4—5 inches broad, it seems a strange article for the police to use. Gamble says the "seeds are eaten after roasting in water, the kernels are used by the Nipalese for washing their hair, and in Bengal by washermen for crimping linen." The seed is sold in the bazar for medicinal purposes, and is used in a powdered form; it is administered as a stimulant, but this use is not mentioned by O'Shaughnessy or others. Dr. Watt in his Economic Products of India says that "an oil is made from the seed, the properties of which are unknown." But the use made of it by the *Dhobis* seems the most general.

EARLY AMBER SORGHUM.

Messrs. Minchin Brothers & Co.'s report on the result of their experiment with this Sorghum, is interesting; it seems curious that hitherto all attempts to make chrystalizable sugar from it in India should have failed, while in America it seems to be recognised as fit to replace Sugarcane in many places. They write:—

"With reference to the Sorghum seed you kindly sent us last year, we sowed the seed in August and harvested the crop at the end of November. We worked Sorghum in our Diffusion apparatus and treated the juice on the same principle as our sugarcane juice, but the syrup obtained would not chrystallize.

"We consequently sent the syrup to the distillery and manufactured very good spirit, but here also we can give you no quantitative result, as having limed and sulphured the juice and exposed it to high temperature, we had by this manipulation destroyed much of its value as a spirit material.

"Some of the juice indicated 10 Beaume, the same as cane juice, but some plants shewed miserable density and were very stunted. The acclimatized seed is evidently not successful, we shall make a small planting in the factory this year, and try it again, as a spirit material, fermenting the juice at once."

In a subsequent, letter Messrs. Minchin attribute the want of success in some measure to the method of selecting seed in this country. They also kindly agree to make experiments with "Alapoor Joar" alluded to in the last Proceedings.

RICHARD BLECHYNDEN, Junior,
Deputy Secretary.

THE AGRICULTURAL DEGENERACY OF INDIA.

AN INQUIRY INTO ITS CAUSES

(FROM A NATIVE CORRESPODENT.)

IN your issue of the 23rd January a correspondent comes forward to correct my errors. I have to request him not to confound higher education with high pressure and a revolutionary system of education. This is the third time that I have had to point out the distinction. The correspondent speaks as if I had attributed the agricultural degeneracy of the country solely to higher education. Evidently he had not read or understood all I had said on the subject. I had to touch upon the high pressure and revolutionary system of University education only in connection with the labour question. Even here this is only one of the causes of the degeneracy of labour, though it is a very widespread and infectious cause in creating a spirit of aversion to manual labour, and an infatuated love of leading an easy life as a mark of a rise in society and gentlemanliness. With regard to scientific agriculture, the correspondent admits that I do not undervalue scientific agriculture, and I pay sufficient importance to it. He admits also that native farmers have some practical knowledge of the advantages of deep ploughing, manuring, rotation of crops, etc. If they know the advantage of these, what is the cause of the ryots not improving their lands even this much, to the best of their knowledge and skill? The cause cannot be owing to want of knowledge, practical or scientific. If the correspondent maintains this position, as he does, he contradicts himself, and his argument is quite inconsistent with his admission.

I value the scientific knowledge of a profession more than the practical knowledge. But I must say that practical knowledge cannot be despised, if productive of good results. This is what I said in my reply to your correspondent "C. S. S." This is no eulogy of native skill. What is Science? It is but practice reduced into theory. When there is not much of a technical or scientific character in a profession, practical skill cannot be undervalued The correspondent appears to be more a theoretical than a practical person. The difference between scientific agriculture and practical agriculture is not so great in their fruits as the optimist correspondent seems to think. He opposes the correctness and accuracy of my statement, that for a poor ryot of limited means "the increased out turn will not pay the increased cost and outlay," and he says further that the cost will not be great for the poor ryot. He cannot be allowed to make this bare assertion and run away. We want figures. Let us take, for instance, wet cultivation, where the native ryots spend much labour and skill. A ryot with a pair of bullocks is able to cultivate about four acres of nunjah lands. The bullocks are used for ploughing in sowing and transplanting seasons, and in stated periods before these times; for carting manure to the fields in dry seasons; and drawing water by water lifts for crops raised in gardens under well cultivation, and in nunjah lands if the water-supply be insufficient from tanks or canals; and for miscellaneous purposes. Bullocks for drawing ploughs in black cotton soil range from Rs. 70 to Rs. 100 a pair. The draught involves heavy work and exertion in proportion to the depth of ploughing. But in nunjah lands the ryots are careful not to risk valuable large sized bullocks in drawing ploughs, as the work is very heavy for them to draw the ploughs wading knee deep through the clay mire, chiefly when the wet method is used. As the ground is turned into a mire before transplanting, an improved plough will require much stronger bullocks than now ordinarily used, at not less than Rs 80 a pair, even for the simple plough referred to The ploughing match on the loose sandy soil of the Saidapet Farm cannot be taken as the standard for the ryots, on ordinary occasions.

The correspondent undervalues the bullocks for the plough which he recommends. In Madras and its immediate neighbourhood there is not so great a demand for bullocks as in rural places. The bullocks which he values at Rs. 40 a pair will fetch a much larger price in rural places. With regard to manuring, the ryots are not contented with mere vegetable leaves. In this district, whose ryots are reckoned among the most skilful in South India, varieties of manures are used, like farmyard manure, decomposed vegetable ashes and kitchen sweepings, tank silt, which is a compound of decomposed vegetable, mineral, and animal substances; nitre soil or salt earth is also largely used. With regard to farmyard manure, the fold system is generally adopted, by which sheep and even cows are folded over the ground previous to cultivation. Thus the dung and urine are secured, and in sheep the strong smell which scientists would call ammonia, is highly valued In the selection of vegetable manure great skill is displayed. For cultivating nunjah lands, according to the best skill and knowledge of natives, is required about Rs. 25 per acre, including labour, manure, seed, &c., setting aside taxation altogether. The average best outturn per acre is Rs. 70 worth of paddy, and Rs 7 worth of straw, taking the price of paddy at 20 Madras measures per rupee. On dry lands the cost of cultivation per acre is Rs. 12, and the average best outturn is Rs. 35 worth of dry grain, at 20 Madras measures a rupee. In cotton cultivation the average best outturn is Rs. 60 worth of cotton per acre. The outturn depends on good weather and sufficient water-supply, without which all the cost of cultivation is so much loss to the cultivators. For scientific agriculture, and for the use of improved implements, the costs will be 50 per cent more, or even double. Taking the increased cost to be Rs. 15 per acre, will the increased outturn by scientific agriculture be above Rs. 60 worth of produce on four acres of nunjah lands? We want figures of increased outturn to be guaranteed. This is the way the poor ryots calculate their income while wealthy millionaires may care for only small dividends and not for recouping the increased expenditure.

As a matter of fact, is the increased outlay and cost paid by increased outturn in the Saidapet model farm? I want to see the farm during my stay in Madras. The outturn of paddy cultivation there must be below the outturn of fields cultivated according to native skill and knowledge. There may be special causes for disadvantages and smaller outturn. I do not ignore the advantages of scientific and improved methods of agriculture as the correspondent thinks I do. The non-adoption of scientific methods can never be taken as the cause of the degeneracy of agriculture in this country, even according to the best skill and knowledge of natives. Even according to the native method, do our ryots plough and manure their fields as well as they could? The correspondent urges scientific agriculture as an effective remedial measure to check the exhaustion of the soil. He is very right in prescribing this effective, remedy provided the people have means to adopt it. But he only prescribes the medicine for the disease. As men do not get disease for want of medicine, so the soil in this country does not deteriorate owing to non-adoption of scientific agriculture.

In most instances, except in cases of petty peasant farmers, landlords or landowners are not the cultivators of the soil. Even those landowners who used to cultivate their lands at their expense, have abandoned the pannai, as it is called, and have adopted and are adopting the system of *leasing out their farms for varam or certain fixed payment*. On account of costly labour, and on account of the hardships in collecting or buying manure and other difficulties, the lease system is found to be preferable. When the lessee spends labour on the fields he cultivates, it is so much saving to him and to the members of his family; but a non-labouring landlord has to lay out money for labour. What is a gain to the farmer in a pecuniary point of view is so much a loss to the latter class. Under these circumstances lands are leased out, and the lessees have no interest in the permanent improvement of the soil, as their tenure is temporary, extending over a short duration, sometimes of a single crop a year, and as the increased outturn will have to be divided between the lessor and lessee, the lessee's portion on an average ranges from 1·3 to 2·3 share of the produce. While it is doubtful or uncertain whether the increased outturn will cover and pay the increased cost and outlay by the adoption of scientific methods when the landowner himself cultivates his fields at his expense, it is not in human nature for a lessee to adopt scientific agriculture, when it will be a far less paying concern, as far as his share is concerned, for the self denying and disinterested profit of his landlord. On account of poverty and various difficulties and hardships, landlords find it their interest to abandon their pannais and lease out their lands. The lessees in their turn, on account of their relationships to the fields they cultivate, cannot be expected to spend much on cultivation and permanent improvement. In very rare instances rich landlords help their lessees in several ways. But in the majority of instances the crops depend upon the enterprise and skill of the lessees only.

That the agriculture of the country is degenerating is the general cry of many ryots. In several exceptional cases the soil may not have deteriorated, but in a good many cases the grievance is real. Persons like Sir James Caird, of the Famine Commission, who had studied the condition of the agricultural classes, have admitted the fact. He mentioned the rich district of Tanjore as an illustration. He attributes the degeneracy to petty peasant farming and subdivision of landed property according to Hindoo law. Though the facts may be true, their injurious influence upon the degeneracy of agriculture is extremely small. The land-owning classes, who form the mainstay of the Government and who are the great sufferers, throw the chief, though not the whole, blame on the Government and its revenue administration. According to their complaints, when money grows scarce among the agricultural classes, when they loyally pay their water tax to the last pie, while their irrigation works and tanks are not kept in good condition equal to the good demand, when the water-supply is quite insufficient for irrigation, when the Forest Laws, extinction of communal rights and various incidence of taxation seriously injure the agricultural interests of the people directly or indirectly. When labour grows costly, when the people are deprived of free pasture for their cattle, and when they are subjected to similar hardships, I do not know how the state of things can be otherwise, and how scientific agriculture can mend them.

Being a landowner and shareholder of a village myself, the grievances of the people exactly coincide with my experience upon which all my statements are founded. The ryots find it impossible to improve their lands. In this connection I condemned the system of double taxation chiefly on nunjah lands in my speech at Pacheappa's Hall. In spite of the special rulings of the Revenue Board standing orders, taxes are levied both for lands, and the trees on them. The existence of trees on the cultivated land causes permanent injury to it by contraction of space, by their shadows, by their roots absorbing the manure and hindering ploughing operations, by the *lopping and falling of leaves and fruits*, and by a thoroughfare being made by the palmyrah climber for each tree yielding produce no less than twice a day even through full crops. Such difficulties, hardships, and injuries have been considerably increased by the recent action of the revenue authorities who have have had the generosity to make over the seedlings and trees (of spontaneous growth) to tree puttadars at the expense of land puttadars in spite of the Statutory Laws of Government (according to Easement Act), justice, and common sense which should respect the usufructuary rights of a landholder especially when they are of spontaneous growth. When a dispute arose about the trees that were seedlings at the time of the Revenue Settlement, but have grown since, one Collector decided that it was only justice that the trees in dispute should be made over to the land puttadars on whose lands they had grown spontaneously. On a petition for review by tree puttadars, another Collector has reversed the decision and has made over the trees to the tree puttadars.

What is still more outrageous is that the land puttadars who removed the grown-up-seedlings injurious to their fields, by virtue of the right conferred on them by the previous decision, have been served with a demand exacting the revenue penalty of thirty years' highest assessment on each seedling removed with an order for attachment and criminal prosecution if the heavy penalty be not paid at once, without showing the least courtesy and justice to the real sufferers by calling upon them for explanation and defence. Among the unhappy sufferers thus outrageously treated, I myself am one. In improving the paddy fields over-grown with palmyrahs and seedlings to the extent of from 80 to 100 per acre my coolies removed ten seedlings whose aggregate value would not be even 10 annas. For removing these ten seedlings I have been served with this outrageous demand of thirty years' penal assessment, which is no less than Rs. 18 annas 12. The treatment is for the exercise of ownership on seedlings spontaneously grown upon the ryots' fields according to most sacred and inviolable natural right. Is this justice, wise administration, taxation, extortion or highway robbery? If this can be said of a person of my position and respectability, what may be said of those that are less wealthy and less influential? In the face of such difficulties presenting all possible obstacles for the improvement of the soil, what is the use of speaking of scientific agriculture? I do not exaggerate things, nor do I assume the *role* of a demagogue and an alarmist. It is a truth, and a sad truth, that the country is greatly degenerating. Whatever be the honorable intention of the Government, whatever be the public and private virtue of the majority of European officers, it cannot be denied that there are serious defects in the administration for want of sufficient knowledge of the condition and hardships of the agricultural classes by the well-meaning and justice loving British Government. These defects require immediate check.—*Madras Mail.*

CULTIVATION OF THE DATE PALM.

Dr. E. Bonavia, of Etawah, furnishes the following interesting particulars regarding the culture and fertilization of the Date Palm, employed in Arabia and along the shores of the Persian Gulf. These notes were primarily intended for the information of those who had in charge the experimental patches of date palms in Oudh, the trees of which were raised from seed imported from Arabia.

Dr. Bonavia writes :—

"I need hardly mention that the flowers of the date palm are of two sexes, the male and female flowers being borne on *different* trees. The Arabian method of cultivation is this: Only female trees are planted, in large groves, the palms being put 12 or 15 feet apart. In order to do this they plant only *offsets* (not seeds, as the sex of these cannot be known before they flower) taken from the foot of the female trees, when these offsets have attained the *weight of three or four seers, that is, after five or six years more of growth on the parent tree. I found September the best season for* planting offsets in Oudh. They are watered daily, or less often, till they strike, and afterwards at longer intervals. In the Persian Gulf groves consist of 80 to 200 palms. They should be protected from cattle; other crops can be grown between the rows; and there should be some means of irrigating the palms. In short, after striking, the trees should be treated in every way as other fruit trees, from which superior fruit is desired, each palm having a large *thala*, which should be preiodically filled with a top dressing of any old manure available, such as cow, horse, sheep, goat, or even fish manure. Only the *decayed* lower leaves should be removed, and *none* of the green leaves should on any account be removed, as these are the lungs and stomachs of the trees. It should not be forgotten that fruit from offsets, if they are properly cultivated, will be like that of the parent tree, while fruit from *seedlings* will vary. Seeds can be sown in beds a few inches apart, and in a year, during the rainy season, transplanted into other beds, two or three feet apart, and finally planted out in groves 12 to 15 feet apart. The Arabs rely on *artificial* fertilization only to insure a crop of dates. The male trees may be any distance, and may have flowered a month or two before the females. The Arabs say that the male bunch of flowers is mature when, by "pressing it, a faint rustling sound is elicited. Also, if a slit is made in the margin of the flower-spathe, a peculiar odour is detected." Then the bunch of male flowers is removed from the tree, the spathe split open, the sprigs of male flowers carefully removed and placed in a suspended basket, protected from droughts and allowed to remain 20 to 24 hours before being used. As soon as the *female* flowers have burst their enveloping spathe, they are fit to impregnate. The cultivator then climbs the trees and inserts two or three male sprigs into each female bunch, and secures them with a strip of palm leaf. Date palms produce from 12 or 24 bunches of female flowers, but eventually only from *eight to twelve bunches of dates* are allowed to remain on each tree. If more are left, the dates, like other fruit, will be small, and many will fall off. They say that date pollen in this will keep fertile for one or two months, and used as occasion requires. The male flowers should, however, be slightly moistened with water to prevent the pollen from being scattered too readily while being used. In the Persian Gulf artificial fertilization is considered a most important operation, otherwise the fruit is "abortive or blighted," without stones, and insipid. After fertilization the trees *are not watered for six or eight weeks.* I should wish now particularly to mention that in Arabia (and presumably in Oudh also) there are *three distinct classes* of date palms, (1) such as do not ripen their dates beyond the red or yellow stage, firm and dry, called *kharek*. This occurs in June and July. The dates of this class can only be preserved by cooking or curing in other ways. (2) Such as turn brown and become soft and juicy, but go no further. This occurs in August. These dates are called *rutub*. *Even in Arabia* this class of dates will not keep *beyond a few days*, as they turn sour. They can only be made to keep by proper curing. (3) Such as go beyond the *rutub* state, and ripen thoroughly into the *khorma*-stage, which is sweet and semi-dry. This complete ripening in Arabia occurs in September. It is this last class of dates; which, after being collected and exposed to the sun, to rid them of their extra juice, are carefully packed into boxes and exported to Europe and America, without any further preparation. It should not, however, be forgotten that *khorma* dates have, of course, to pass through the two previous stages, namely, of *kharek* and *rutub*. All the classes of dates, at *all* stages, are edible and nourishing, and the Arabs feed on the one or the other kind all the year round. The shrivelled, unripe droppings, or such *as are not fertilized*, and therefore *insipid*, are given to goats, sheep, and cattle. In the Gulf, there are upwards of a hundred varieties of date palms. And, as something like fifty varieties of date seeds were sent to Oudh, there are sure to be in almost all the districts many puzzling classes and sub-classes of date palms. In the Lucknow Horticultural Garden alone there are upwards of 252 seedlings, varying from 12 to 13 years old, and I am informed that there are hardly two alike. In the districts there are only seedlings of the foregoing ages. Unfortunately, however, those in the districts are scattered, and unless artificial fertilization be practised, little will be known of their worth. The male flowers of the *khajoor*, or jungle date palm, are as good as any for purposes of fertilization, but the plants resulting from such crossed seed would be mongrels, although not improbably very good mongrels. With regard to protecting the ripening fruit from the depredations of bees, wasps, birds, and squirrels, the Arabs do little. Their plantations are on an immense scale, and the loss from these causes they consider unimportant. Sometimes they envelop the ripening bunch of dates in the leafy branches of some bush, sometimes in bags made of date-leaf matting; but where very choice varieties are grown, and the trees are small, they cover each bunch with a gunny bag. Squirrels in India are a great nuisance, and would tear the gunny and use the fibre for making their nests. Thorny branches of *babool* and *bair*, tied round the palm stems, would, however, prevent them from getting up."—*Planters' Gazette*, (English paper).

RHEA FIBRE.

The Manchester manufacturers are now giving increased attention to the use of this fibre, and as it is our province to give all the reliable information obtainable upon every subject likely to benefit tropical planters, we place below some extracts from a paper recently published by Sir Joseph C. Lee, the well-known Manchester millowner. Speaking of the difficulty of cheaply extracting Rhea fibre, he says :—

The problem that many inventors have tried to solve is to make a machine or discover a process by which the work can be done effectually and cheaply, so that the fibre can be sold in London at £[illegible]0 to £50 per ton in the ungummed state. Various mechanical appliances and methods have been invented, but only two of them seem to fulfil the conditions necessary for successfully treating the fibres. The first of these is a machine invented by Mr. H. Smith, and improved by Messrs. Death and Ellwood, of Leicester. It is claimed by the inventor that this machine will clean any vegetable fibre, and particularly Rhea or China grass. To this machine was awarded the prize of 2,000 rupees in accordance with the recommendation of the "Committee appointed by the Government of Bengal to conduct a trial of machines and processes for the extraction of Indian fibres" on the 24th November last year. The report states that the cost of a single machine is £55, that of a double one, complete, £100. A semi-portable engine to work two machines will cost £32 10s. The quantity of water required appears to be about 400 gallons per hour for one machine, but the water can be used twice over. The work turned out in ten hours by one machine is 2,200lb. of green stalk. This quantity might be expected to give 3 per cent, an out-turn of 66lb. of good clean fibre. The value of this out-turn at £50 per ton would be about 30s.

The machine is the property of the General Fibre Company, Fenchurch-street, London, and is doubtless a valuable patent, and will be useful in cleaning some kinds of fibrous plants. No Rhea fibre has yet been imported that has been treated by this machine, we can only judge of the practical value from the evidence contained in the official report. In this it is stated that 3 per cent of fibre can be obtained under favourable circumstances from every 100lb. of green stems. This percentage will contain at least 15 per cent of resinous matter, which must be discharged before the fibre is ready for the spinner. This will give 2·55 per cent of pure filasse—a small percentage, which cannot be profitable if the fibre is to be sold at £50 per ton. Another drawback to the value of the machine is the quantity of water required to clean the fibre. In a climate like India it is not always possible to obtain water in sufficient quantity. Therefore, if only 30s. worth of fibre can be obtained per day from one of these machines (as stated in the report), it can hardly be said to be a commercial success so far as the treatment of Rhea is concerned. The second plan of treating the Ramia or Rhea is one patented by M. A. Favier, and is a simple method of decorticating the stems of the plant on the fields where they are grown. It is as follows:

I visited the works at Louviers belonging to the Société de Crédit, accompanied by a director of the Company, Mr. Vian, Professor Urbain, Mr. Paterson, and Mr. Casper, of the firm of Messrs. G. W. H. Brogden and Co., the English owners of the patent, and by Mr. P. Nursey, the editor of the *Iron*, and others. We were shown samples of Ramia grown in France, Algiers, Egypt, India: all decorticated, some of them by the Favier process, others by methods unknown. Seven different growths of Ramia were selected and placed in a large boiler or high pressure kier. Probably half a ton of ribbons were thus under treatment, and when they had been thoroughly saturated by a solution of which, one of the component parts, if not the whole, was apparently caustic soda, the top of the kier was fastened down, and steam at a high pressure (80 pounds) was turned in from the bottom of the kier. The boiling extended over a period of five hours. On the kier being re-opened the whole mass of fibre was seen in a black condition. Mr. Urbain took about a pound weight of ribbons and treated them as follows:—He washed them in cold water, then in a solution of hydrochloric acid, again in water, then in chloride of lime, and lastly thoroughly in cold water. The ribbons then appeared in the form of whitish grey filasse, ungummed and free from the brown pellicle; the fibres could then be easily separated from each other, and were apparently in the condition for treatment by machinery. The operation lasted ten minutes. The inventors claim that by their process 5 per cent of pure ungummed fibre is obtainable from the green stems.

I see little difference betwixt the process I have described and the one used by bleachers of cotton cloth for dyeing or printing which is necessary to make the cloth chemically pure, and similar drugs are used to "kill" the husk and brown bark often left in the yarn; this is done without the least injury to the fibre. I am of opinion that the merit of the invention consists in the knowledge obtained by experiments, of the strength of the caustic soda required for destroying the pellicle and reducing it to a state of pulp without injury to the fibre. The after process is a clearing one; it removes the gum and pulp, and the chloride takes away any colouring matter that may remain. This invention may be considered a satisfactory and inexpensive method of ungumming the Ramia fibre, and if the patent rights be obtained by the producer of the yarns, it will add to its popularity.

I shall now deal with the cost and production of the plants and the probable future of the industry. Of late years the French have given a great deal of attention to the cultivation and utilisation of the Ramia plant. It has been grown in the basins of the Gironde and Rhone, in Algeria, and in Egypt. M. Norbert de Landtsheer who has written much on the subject, gives the following table, showing the latitude in which the plant can be grown:—

Latitude of country.	No. of crops.	Names of countries corresponding to latitudes.
36° to 46°	2	Bordeaux, Grenoble, Avignon, Turin.
38° to 42°	3	Corsica, Sardinia, Madrid, Naples.
35° to 37°	4	Algeria, Tunis, Northern China, New Zealand.
25° to 32°	4 to 5	Egypt Delta, Lahore, China, Florida, Mexico, Chili, Bus. Ayres, Australia.
15° to 20°	5	Madras, Bombay, Cochin China, Brazil, Jamaica, Cuba, Hayti.
0° to 10°	5 to 6	Sumatra, Johore, Ceylon, Jayana, Venezuela.

He states also that an acre of cultivated Ramia can give 200,000 stems at a cutting, each stem averaging 1½oz. In Algeria, where four crops a year can be grown, a profit of £19 12s. 6d. per acre has been obtained. If we take these figures as being correct—and I have not heard of them being disputed—we have 20,000 stems per acre, or 18,730 lb. weight, which will produce about 1875 lbs. of ribbons, and by the Fremy-Urbain ungumming process 937½ lb. of filasse, which at £50 per ton gives 5⅜d. per lb. I was told by the director of the Société de Crédit, &c., that they had signed contracts for 10,000 tons of ribbons at £10 per ton, to be delivered in two years, and that they were prepared to take 100,000 tons at that price. Therefore, if we take two tons of ribbons as costing £20, which will produce one ton of filasse; ungumming, two tons, at £8 per ton, £16; charges, shipping expenses, £4, or 4½d. per lb.—£40 per ton. A ton of cotton cloth can be bleached for £6 per ton; the ungumming process being a quicker one should not cost over £5 per ton.

Several companies in India are now growing Rhea, notably the Glenrock Company, and a Company has been formed to plant 20,000 acres in Johore, where it is expected that five or six crops can be obtained yearly. It will be seen that before many years have passed an enormous quantity of this fibre will be shipped to Europe, and as the plant is perennial, and once planted will last a hundred years, some idea may be conceived of the yield in prospect. A manufacturing community like Lancashire cannot afford to ignore the new industry which will undoubtedly spring up within a few years. I readily admit that a vast sum of money has been lost by manufacturers in their attempts to develop this new fibre, but, as I have shown, the conditions are now somewhat changed. Formerly the quantity of fibre imported did not exceed a yearly average of 100 tons, consequently the value has been much affected by the demand, the price at some periods rising to £120 per ton and at others falling below £30 per ton. We have now the prospect of large supplies of the fibre at a reasonable rate and under favourable conditions. Makers of spinning machinery will do well to give their special attention to the preparation of machines capable of treating the long silky fibres of the Ramia. The French are already at work. During my visit to Louviers, the gentlemen who accompanied me were granted the privilege of an inspection of the preparing, carding, and spinning machinery, but this courtesy was denied to myself, on the plea that secrets might be revealed before they were secured by patent right. I was, however, shown the fibre in the sliver and also in yarn equal to 10's, 16's, 24's, 30's cotton, all of which seemed satisfactory, and I have since received samples of the fibre I saw treated at Louviers, which are excellent. It will be asked, in what is Ramia better than cotton or hemp? I reply that it is better in many respects. It is nearer in appearance to silk than any other fibre, and, like silk, it is a non conductor, or nearly so. It can be mixed with silk or wool, and it will give strength to both. It can be produced more cheaply than flax or hemp, and is three times as strong. It is stronger than cotton, and takes better colours—faster and more lustrous. It is invaluable for healds, ropes, hose, sailcloth, cloth or waterproofing, clothing for men, Indian army clothing, furniture covering and hangings, cambrics, and summer dresses; and, in the words of a well-known chemist, "It is difficult to say what it is *not* good for. It is the strongest fibre in nature."

Mr. P. Nursey, C.E., Vice-President of the Society of Engineers who accompanied Sir J. C. Lee in his visit to the works at Louviers, reports as follows:

I may premise that the successful utilisation of the rhea fibre necessitates that decortication, or the stripping of the skin off the stems of the plant, shall be performed by a method which shall ensure that no fragments of the woody stem shall be left adhering to the skin in which the fibre is contained. Moreover, the stems must be decorticated as soon as cut, as the resinous matter in which the fibres are embedded rapidly hardens, a fermentation is set up which injuriously affects the fibre, and it is extremely difficult to deal with the ribbons afterwards; besides which, when decorticated in this condition, some of the fibre is left adhering to the wood, and great waste results. The process of decortication invented by M. A. Favier having been proved to be thoroughly successful in dealing with rhea, and having inspected its working on two occasions, I think it as well first to briefly refer to it, especially as it appears to me to be the most perfect, as well as the most natural, method of producing the ribbons containing fibre for further treatment by the Fremy-Urbain process.

M. Favier's process consists in submitting the stems of the rhea or other fibrous plants to the action of steam at a low pressure for a period of about twenty minutes. The apparatus required is of the most simple and inexpensive character, consisting only of wooden trough-shaped boxes and a low pressure steam boiler, whilst the operation of stripping the stems after they have been steamed can be performed by unskilled labour, or even by children. This process insures the obtaining of the whole yield of fibre from the plant, without deterioration or waste, and at a small cost.

The Fremy-Urbain process is the joint invention of the distinguished French chemist, Professor Fremy, member of the Institute of France (who is well known for his researches into the nature of fibrous plants and the question of their preparation for the market), and M. Urbain, who is Professor Fremy's principal assistant in the Government Laboratory, Paris, of which the Professor is chief. The process consists mainly in an alkaline treatment under conditions which vary with the character of the rhea fibre to be treated. A most important factor in the success of the Fremy-Urbain process, and that which I regard as the crowning feature of the whole, is the special treatment of the fibre. Throughout the whole process there is not one stage to which exception can be taken on the score of danger to the ultimate fibre, whilst there is, on the other hand, a perfect harmoney of arrangement and sequence of development.

It is unnecessary for me here to enter into all details of the operations as witnessed by me, and as fully and unreservedly explained to me by Professor Fremy. Suffice it to say that upon one occasion I saw about 800 lbs. of ribbons treated at Louviers, and upon a second occasion about half a hundredweight.

With regard to the question of dyed yarns, I may point out that it is essential, in order to take dyes, that the article to be dyed shall be chemically pure. I received Professor Fremy's emphatic assurance that there is nothing whatever in either the Favier or Fremy-Urbain processes which militates against this purity. The Professor, morever, has a formula by which the purity or otherwise of the material to be dyed can be readily ascertained.

Taking into consideration the successful results I have seen produced, and the perfect condition in which the fibre can be turned out, I am of opinion that the Fremy-Urbain process is an invention of the highest importance, and, considering the value of rhea fibre as regards its strength and beautifully lustrous appearance when worked up, I am further of opinion that this material, properly prepared, would command a most extensive market. That this would be the case may be inferred from the fact that there is at present a great demand for rhea fibre, notwithstanding that it is more or less imperfectly produced.

From careful observation of the working of the Favier and Fremy-Urbain processes in conjunction, I am satisfied that, as far as the production of pure undamaged fibre of long staple goes, the two processes are in accord, and are thoroughly adapted for each other. Properly conducted, I feel convinced that their results must lead to an important expansion in the textile industry of the country.—*Planters' Gazette* (English paper.)

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

THE disease commences with a slight derangement of the stomach, but if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions, he will be able to determine whether he himself is one of the afflicted:—Have I distress, pain, or difficulty in breathing after eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste? Is the tongue coated? Are there pains in the sides and back? Is there a fullness about the right side as if the liver were enlarging? Is there costiveness? Is there vertigo or dizziness when rising suddenly from a horizontal position? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach? Is there frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one of long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantity of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market-Place, Pocklington, York, Oct. 2, 1882.

Sir,—Being a sufferer for years with dyspepsia in all its worst forms, and after spending pounds in medicines, I was at last persuaded to try Mother Seigel's Curative Syrup, and am thankful to say have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same complaint to give it a trial; the results they would soon find out for themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. TURNER.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

St. Mary-street, Peterborough, Nov. 29, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,

WILLIAM BRENT.

Mr. A. J. WHITE.

Hensingham, Whitehaven, Oct. 16, 1882.

Mr. A. J. WHITE.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) JOHN H. LIGHTFOOT.

August 15th, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.—Yours truly,

(Signed) N. WEBB,

Chemist, Calne.

Mr. WHITE.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues. One customer describes it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Signed) VINCENT A. WILLS,

Chemist-Dentist,

Merthyr Tydvil.

To Mr. A. J. WHITE.

Preston, Sept. 21st, 1883.

My Dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said, "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully; in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.—I am, dear Sir, yours faithfully,

(Signed) W. BOWKER.

To A. J. WHITE, Esq. (A)

THE

INDIAN STATESMAN,

In which the FRIEND OF INDIA is incorporated.

A WEEKLY JOURNAL

OF

INDIAN POLITICS AND FINANCE,

EDITED BY

ROBERT KNIGHT.

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THE

INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, MAY 23, 1885. [No. 21.

Crop and Weather Report.

[FOR THE WEEK ENDING MAY 13, 1885.]

General Remarks.—Slight rain has fallen throughout the Madras Presidency, and showers have been fairly general in the Mysore State.

In Bombay there was light rain in parts of twelve districts. In the North-Western Provinces and Oudh, in the Punjab, and in the Central Provinces, rain fell in nearly every district during the week under report. Slight rain is also reported from the Nizam's Territories and the Central India and Rajpootana States.

In Bengal good rain has fallen in several districts, and prospects of standing crops have greatly improved, while agricultural operations have been facilitated. Rain was general in Assam.

In Madras agricultural prospects are unchanged, and are unsatisfactory in parts of the Bellary and Anantapore districts, where the standing crops are withering. The harvest outturn has been generally below the average.

In Mysore the season is reported to be drier than usual, but there will be no cause for serious apprehension if the June and July rainfall is regular and plentiful. The cattle are in poor condition from scarcity of fodder and water.

In Bombay and the Central Provinces preparations for the *kharif* crops are going on well. Scarcity of fodder and water continues in parts of Bombay. In the Punjab *rabi* crops are being harvested, and preparations are in progress for the *kharif* crops. In the North-Western Provinces and Oudh, the *rabi* harvest has been almost completed and threshing is going on. Some injury has been caused to grain on threshing-floors by the recent rain.

Agricultural prospects continue generally good in the Berars, the Nizam's Territories, and in the Central India and Rajpootana States. Ploughing and sowing continue in Assam.

Except that cholera and small-pox are present to some extent in most provinces, the public health is generally good.

Prices are on the whole generally stationary.

Madras.—General prospects fair except, in parts of Bellary and Anantapore.

Bombay.—Slight rain in parts of 12 districts. Preparations for *kharif* crops in progress in parts of 8 districts. Scarcity of fodder continues in four talukas of Belgaum and three of Dharwar, and of drinking-water in six talukas of Dharwar and four of Belgaum. Small-pox in parts of 13, and cholera, cattle-disease, and fever in parts of 10 districts.

Bengal.—Rain fell throughout the Provinces except in 1 or 2 districts; it has greatly improved the prospects of standing crops and pushed on agricultural operations. Prices of food-grains generally stationary. Public health good, though sporadic cases of cholera and small-pox are reported from some districts.

N.-W. Provinces and Oudh.—Rain has fallen throughout the Provinces. Slight injury caused to grain on threshing-floors. Markets well-supplied and prices steady. Cholera and small-pox continue in some districts.

Punjab.—Rain has fallen in nearly every district. A few cases of cholera in the Umballa and Mooltan districts, health otherwise generally good. *Rabi* being harvested, outturn in the Sialkot and Lahore districts somewhat damaged by rain. *Kharit* operations commenced. Prices of food-grains generally stationary.

Punjab.—Rain has fallen in nearly every district. A few cases of cholera in the Umballa and Mooltan districts; health otherwise generally good. *Rabi* being harvested, outturn in the Sialkot and Lahore districts somewhat damaged by rain; *kharif* operations commenced. Prices of food-grains generally stationery.

Central Provinces—The weather has continued unsettled, with occasional showers of rain. *Kharif* ploughings have commenced. Cholera is prevalent in a few districts. Prices are steady.

British Burmah.—Cholera is still severe in town of Pegu, and is more or less prevalent in parts of Akyab, Bassein, Thongwa, Amherst, and Shwegyin districts; some cases of small-pox in towns of Henzada and Ramra, and in Tharrawaddy districts; slight cattle-disease in some districts, and severe in one township of Bassein district. Weather continues hot.

Assam.—State and prospect of crops good. Cholera, small-pox, and cattle-disease continue. Ploughing and sowing in some districts progressing. General health good. Scarcity in north Lakhimpore continues.

Mysore and Coorg.—Sugarcane and paddy under tanks in some parts reported to be withering. Prices generally stationary. Cattle in poor condition from scarcity of fodder and water. Public health fair, but cases of cholera occur. Season drier than usual, but no cause for serious apprehension if June and July rain fall is regular and plentiful. Paddy, coffee, and cardamom crops in good condition. Prices of food-grains slightly risen. Prospects of season good.

Berar and Hyderabad.—Weather hot. *Kharif* preparations continue. Crops in Asfnagar taluk damaged to some extent by hail. General health fair, except in Shababad taluk, where cholera continues stationary.

Central India States.—Weather rather cloudy. No more cholera in Residency. Health good. Prospects favourable. Prices stationary.

Rajpootana.—Weather cloudy and stormy. Tanks and wells good. Prices rising in Marwar, but stationary elsewhere. Outturn of grain and opium crop average. Cholera in Tonk during week. Small-pox prevalent in some districts. Public health generally good.

Nepal (May 7th)—Weather seasonable and cool. Prospects fair.

Letters to the Editor.

REAPING PADDY BY MACHINERY.

TO THE EDITOR.

SIR,—Of all agricultural operations, harvesting paddy is the most tedious. And the loss from the sludding of grain and liability to showers which occasionally overtake it, is very great. It is impossible to realise the heavy loss from these misfortunes without actual experience. Several varieties of paddy which yield well, but shed the grains readily, cannot be cultivated on this account. Now, the question is, can you successfully introduce reaping machines on paddy fields? The fields must be large, at least 4 to 5 acres, if not larger. The wheels of the reapers should be broad, as the soil is generally wet in October and November. The machines should be of the simplest description, such as (field) mowing machines. Several attempts have been made to introduce reaping machines on indigo fields. I do not know how far they have proved successful. But as indigo is mostly grown at contract rates, and the cutting is generally managed by the ryots, and not by the indigo planters themselves, there has been no want felt for an indigo-cutting machine. From what I have seen of the management of machinery by tea garden coolies, I am not in the least afraid of the ryots not being intelligent enough to manage reaping machines. They will require a little teaching at first, as in everything else, and with that, they can be well left to themselves. Now, the question is, can reaping machines be introduced on Bengal paddy-fields? I write to *you* from a place that Dame Nature never meant for paddy cultivation. The land is steep, and the fields are necessarily very small. There are about 10 to 40 fields to an acre. It is on the plains, where the fields are large, or can be made large, that the introduction of reaping machines may be safely attempted; and it is only the zemindars who have cultivation of their own, and the well-to-do ryots who can afford to make any experiments.

S. DATTA.

Moburbhunj, April 23, 1885.

NOTE.—We are glad to receive this letter from our correspondent. The subject is an important one, and we hope the readers of the *Indian Agriculturist* will favour us with their views on the point raised in this letter.—*ED., I. A.*

Editorial Notes.

We learn that the topographical survey of the Andaman Islands, which was commenced some two years ago by Captain Hobday, of the Survey Department, who had his head-quarters at Port Blair, and has also a vessel placed at his disposal for the purpose, is progressing satisfactorily.

⁂

We understand that the first meeting of the members of the Committee of the Bengal Branch of the Indian Court of the London Exhibition, recently appointed by the Local Government, was held on 15th instant, and that an officer in charge of the exhibits, and a few artizans in connection with certain classes of articles, will be sent to England by the Government of India.

⁂

A contemporary learns that the Forest Conservators and the Board of Revenue at Madras have reported unfavourably on a suggestion that a School of Forestry should be opened in connection with the Agricultural College at Saidapet. It is considered that the present plan of sending students to the Forest School at Dehra Doon cannot be improved upon. It is further pointed out that in any case Saidapet would not be a suitable place for such a school, inasmuch as the place does not possess the forest surroundings requisite for practical instruction.

⁂

The suggestion of the Government of India for the exemption of Railway Companies from the payment of land-cess, under section 37 of Act IV. of 1871, and section 63 of Act V. of 1884, has been adopted by the Madras Government, who have sanctioned the remission of all demands against Railway Companies on account of land-cess under Act IV of 1871, section 37. We have no information as to whether the suggestion has been adopted in the other presidencies and provinces; but the presumption is that it has.

⁂

Apropos of Mr. Doyle's contribution dealing with the Lucknow Paper Mill, some very curious statistics as to paper-making have recently been compiled on the Continent. It seems that there are 3,985 paper mills on the face of the earth, in which annually 1,904 million pounds of paper are manufactured. Half of this paper is used for printing; 600 million pounds only for newspapers, the consumption of which has risen by 200 million pounds during the last ten years. As to the use of paper by individuals, an average of 11½ lb. is used by an Englishman, 10½lb. by an American, 8lb. by a German, 7½lb. by a Frenchman, 3½lb. by an Italian or Austrian, 1½lb. by a Spaniard, 1lb. by a Russian, and 2lb. by a Mexican. If the consumption of paper is a gauge of civilization, this table of averages is very flattering to our national conceit.

⁂

A correspondent from Motihari, writing under date the 6th instant, furnishes the following items of local news:—After an extended drought of many weeks, we had at last two good showers of rain on Monday and Tuesday evenings. The rain on Monday was accompanied with hailstorm, which did considerable damage to the remnant of the scanty mangoe crop of this year. The rains, however, will do much good to public health and cultivation. The prospect of the indigo crops is now more hopeful. The price of rice has gone up considerably in comparison with pulse and grains. Cases of fever and chicken-pox are reported from the town and its suburbs.—The other day a sad occurrence took place in the lake fronting the Magistrate's bungalow. Two men, while crossing in a boat, were drowned by its upsetting at a short distance from shore.

⁂

On the 24th March, Captain Plummer, of the Mysore Gold Mining Company, reported to his Directors: "Mining Operations: We have a full party of men sinking Taylor's shaft under the 173. There are three shifts worked, mornings, afternoons, and nights One Englishman and six coolies are employed in each shift, and as the cost of the Englishman is so great compared with the coolies, no bargain is let, the Europeans take full charge and responsibility, and the coolies are paid 6 annas per day. Very good work was done last week. We have got into proper trim for sinking on the lode, and we carry the western wall in the shaft. The lode is 4½ feet wide; assay value 4 ozs. 9 dwts. 20 grs. per ton. We have not been able to keep the bottom south end full-handed. The lode appears to be getting smaller, though it is now 4 feet wide; assay value this week 5 ozs. per ton. Three men only have been employed at the bottom north end. I have already informed you that the quartz is cut out. Our great aim is to get through to No. 1 winze."

⁂

A few months ago Messrs. Parry and Co. brought to the notice of Government that by the failure, during the floods of December last, of the Veranendy division bund, which takes off the overflow of the Pooniar near the Tirugalur anicut, a large volume of water was thrown into the Malabar stream, which consequently left its own bed, and in finding a new course damaged their property to the extent of Rs. 12,000, at the Tiruvanellore factory, and they urged the liability of Government for the damage. The matter being reported upon by the Public Works Department, the Government observed that after a careful perusal of the papers, it was unable to acknowledge that any obligation attached to the Government to protect the factory belonging to Messrs. Parry and Co. at Tiruvanellore, while it was of opinion that the proposal to abandon the ruined Koriar embankment and construct an embankment across the Malabar below the head of the Koriar channel was based on good ground, and that the embankment would prove an efficient protection to Messrs. Parry and Co's property. It was, however, beyond doubt that the factory buildings had been constructed on a site which was liable to damage on the occasion of such extraordinary floods as those of December last, and any risk that may consequently be incurred must be accepted by the owners of the property.

⁂

There seems to have been some misapprehension in regard to the representation of the Madras presidency at the London Exhibition of 1886. We find that the officer in charge of the Exhibition Branch of the Government of India, in the Revenue and Agricultural Department, addressed a letter to Mr. Wilson, the Director of Revenue Settlement and Agriculture, Madras, whose co-operation he solicited in obtaining a complete collection of silk moths, cocoons and raw silks for the Indian collection of exhibits to be sent to the London Exhibition. This letter he communicated to Major Walker, the Conservator of Forests, Southern Division, for such action as was necessary. Major Walker, however, has suggested that the Madras presidency should be separately and independently represented at the coming Exhibition in forest and agricultural produce, and that he is taking steps to get together a really good and representative collection of forest produce; but that he cannot undertake to make *two* collections—one for India, the other for Madras.

⁂

The Government of Madras, in passing orders on this subject, have decided that they do not consider necessary that the Forest Department should act independently in the matter of forwarding exhibits; the Government of India, it is said, had already called for a set of wood specimens for the Exhibition, which had been forwarded. The collection of silk moths and raw silk now desired, is to be obtained by the Director of Settlement and Agriculture; and that any supplementary exhibits, which the Forest Department may desire to forward, should be sent through the Committee now working in Madras, to secure an adequate representation for that presidency on the occasion.

⁂

Colonel H. T. Rogers, Superintendent, Madras Survey, has submitted a proposition statement, together with certain additional information called for by the Madras Government, for the reorganization of the Survey Department. Colonel Rogers's revised proposals will involve an expenditure of Rs. 7,57,308 against Rs. 6,50,130 on the present scale. The period for which this expenditure is estimated will range from 1884-85 to 1888-89, or five years, and the forecast of anticipated outturn of work during this period for five parties is 8,345 square miles of topographical survey; but this includes Malabar, where very slow work is looked for. These proposals, with a few unimportant modifications, have been approved and sanctioned by the Madras Government.

⁂

It may be observed here that Colonel Scott, the former Superintendent, estimated these surveys for four parties, to accomplish 12,000 square miles of revenue, 1,000 square miles of forest, and 3,000 square miles of topographical survey, at a cost of Rs. 5,70,000. The Madras Government think that the outturn for the five parties recommended by Colonel Rogers in ordinary districts, should be 9,650 square miles of revenue, and 13,985 square miles of topographical, or an average per annum of 1,930 and 2,797 square miles respectively, for eight lakhs of rupees. This is a very important work, and much valuable information is looked for from the labours of the five survey parties now proposed.

⁂

We learn that the report recently by Mr. Wilson, Director of Revenue Settlement and Agriculture, Madras Presidency, on the working of the Madras Cattle Disease Act II of 1866, in that Presidency, has been referred by the Madras Government to the Government of India for their information. The Act does not appear to have been very extensively worked; but its provisions were partially applied in 1876 to the Wynaad District, to check an outbreak of rinderpest; in 1879 to the Nilgiris, on an outbreak of rinderpest occurring amongst the Toda and Badaga cattle, and in 1882 to the Trichinopoly District. Mr. Wilson's conclusion, from such experience as has been gained, is that prompt and immediate segregation is the best way of checking the spread of disease, and that proper medical treatment will save a large proportion of the animals attacked.

⁂

A CONTEMPORARY publishes the following suggestive article :—

> The East is popularly supposed to have been the home of the parable, and a talent for parable-making undoubtedly survives in certain secluded parts of this country. The Deputy Commissioner of the Sumbulpore District in the Central Provinces was met, when entering a village one morning, when the sun was high, by a torch-light procession. Being somewhat puzzled he inquired whether the superfluous illumination was in honour of some local deity unusually anxious for light, or whether it was only an outburst of local loyalty in his honour some ten hours before its time. He was gravely informed that the people of the village considered the torch-light necessary to guide him through the darkness which had overshadowed them under English rule. Of course he asked—as he was meant to ask—what tangible proof they had to give of this darkness that could be felt at midday. And it then transpired that a neighbouring village headman had cut and carried timber from forest-land which the torch-bearers regarded as peculiarly their own. The guileless villagers were wise in their generation Their ingenuity and the outlay of an anna or two on oil saved them a 15-miles journey for the purpose of getting a petition written; the payment of writing fees (an amount which is too often well worth saving); and a further long journey to present the petition, to say nothing of the superiority in point of force of complaint by tableau over the everyday *urzi*.

⁂

THE following is a summary of William James and Henry Thompson's fortnightly circular of Indian and Ceylon Teas :—Upwards of 38,000 packages have been catalogued for sale during the fortnight, including 2,600 packages of Ceylon and 4,100 packages of second-hand and reprinted tea. Demand has continued strong, and prices for all but the lowest grades have favoured sellers, quotations being especially firm for good Pekoes and Broken Pekoes and for the finer sorts of Pekoe Souchong and Broken leaf; while inferior kinds closed a little cheaper than last week, but with buyers at the reduction. Duty has been paid from the 1st to the 21st instant, upon 18,000,000 lb., as against 7,000,000 lb. last year—and the clearances from the warehouses continue heavy. During the past few weeks the dealers have been selling freely, and are now preparing for a period of quietness after the Budget. As the date of the Budget has been altered to 30th instant, auctions will be held on the 27th and 28th instant, 9,000 packages being already advertised: this week's sales ceased on the 21st instant. There remain about 55,000 packages to be sold to close the crop, against 100,000 packages at this date last season. The exports from Ceylon from the commencement of their shipping season (called 1st October) to 26th March were 1,000,000 lb., against 600,000 lb. in the previous year. About 6,000 packages have been sold here in the past two months, the average price being 1s. 3d., the same as was obtained last year for about half the quantity: many of the later imports show improved quality, and are readily taken by consumers.

⁂

THE general conclusion to which the Conservator of Forests has come is, that although the information available from most districts is too vague to admit of definite conclusions being arrived at at this stage, he is convinced, after recent inspection of the mahogany trees at Nilambur, that this valuable timber tree can be grown to advantage in the Madras Presidency under suitable conditions as regards soil, climate, and congeners. The mistake hitherto made in Nilambur has been planting too close and with too much shade. In proposals, which he is now framing, for an extension of the Nilambur plantations, he advocates planting the mahogany in alluvial soil at 50 feet apart as standards along with teak to be treated as coppice, and feels confident that this method of treatment will result in success—an opinion in which Messrs. Morgan and Hadfield concur. The larvæ of the moth (Pyralidæ) is certainly a dangerous enemy, but he doubts if serious damage will be done by it to trees growing vigorously under suitable conditions, such as are apparent in the case of the isolated tree in the Chathambari block, which has never been attacked.

⁂

WE have before us the official papers on the reconnaissance survey made nearly two years ago, of the country between Mogulserai and Daltongunge, which will form the first section of the proposed through line to connect Pooree with Benares. The Government of India showed considerable 'anxiety' for these surveys, but it remains to be seen whether any steps towards the construction of the line will be taken during the ensuing working season, now that survey parties have been for two seasons in the field. We learn that the country between Mogulserai and Daltongunge, which is to form the first section, has been thoroughly explored, and that the alignment follows in the first instance, the direction of the Grand Trunk-road, towards the large city of Sasseram. The line will then take a southerly direction, and run by the Sone river, until it passes beyond a point above the confluence of the Sone and Koel. At a place marked Scrinnugger, opposite to Percha, the line crosses the Sone, and following a southerly and easterly direction goes on to Gaddie, some five miles north of Daltongunge, where we believe an extension of the Patna-Gya line is intended to join it. It appears that the difficulties which presented themselves, have been completely met by (1) running the line in the direction of the Grand Trunk-road, thus skirting along and round the range of hills lying to the south of Mogulserai, and (2) by crossing the Sone at a narrow point, with a good foundation. The great difficulty, however, was the spanning of the Sone river, but that also is removed now that borings have been taken, and it is found at how small a depth the foundations for a bridge will find a rocky base. The decision to run the line by Sasseram is in the right direction.

⁂

IN the *Statesman* of the 12th March last, the "Coal Question" was ably discussed by a correspondent X, who was evidently well qualified to deal with it. The frigid indifference of the Government to the Rewa coal-fields was animadverted on, as shewing an apparent intention to exclude the Rewa product from the market. We are glad, however, to find that our correspondent's notions in the matter were mistaken, and that the best steam coal in India—which Mr. HUGHES, of the Geological Survey, has proved to exist in the Native State of Rewa—will no longer remain undisturbed, and that the Railway Companies of Central and Western India will get access to what ought to be their cheapest fuel supply. A satisfactory beginning has been made in regard to the working of these coal deposits—said to be the richest yet discovered in the East. Shafts have been sunk and coal mining commenced by Mr. THOMAS FORSTER, the well-known mining engineer, to whom we referred in these columns in connection with the catastrophe at Warora, in 1882, when Mr. FORSTER recovered the under-ground workings, and restored the Government colliery there, into working order. Mr. FORSTER has since been associated with Mr.

Hughes, his chief, in the examination of the Rewa-Gondwara basin, and the first fruits of his practical exertions in seconding Mr. Hughes's efforts, towards the establishing of an extensive colliery at Umaria, is the news to hand, that several thousand tons of coal are now awaiting the opening of the railway from Kutni, which will connect the mines with the East Indian Railway. When we consider that the prospect of the field is an annual out-put of 300,000 tons, the importance of the undertaking to the Native State concerned, cannot be over-estimated. Its enormous value, geographically and economically, to the British Indian Railway system, needs no comment.

⁂

Mr. C. S. Crole, Collector of Madura, has been brought to book by the Madras Board of Revenue in reference to his recommendations for dry remissions in certain taluks, which he alleges have suffered severely from drought, floods and other causes. Thus Mr. Crole says generally that the ryots, presumably of the whole district, reaped little or no harvest from their early dry crops, while their subsequent cultivation was affected by the heavy rains and floods—the outturn of the crops then standing being estimated at from four to eight annas in the bad tracts, and from two to four annas in the worst. He gave no statement of villages affected, or of estimated remissions in each village, but made an indefinite recommendation to grant a remission of from 25 to 50 per cent of the whole assessment of all the dry lands in *some* taluks (not specified). Further on in his report, he did not consider that any remission for dry waste was called for; but whether this opinion was intended to apply to the whole district, or only to some, was not clear. If intended to be of general application, the Board were of opinion that recommendations for dry remission, which advisedly excluded from their scope dry *waste*, carried condemnation on their face. Mr. Crole then recommended that 25 per cent of the whole "dry" assessment of the district (which amounts to nine lakhs of rupees) be remitted in those tracts which he considered "bad," and 50 per cent of those classified as "worst." This the Board declined to sanction.

⁂

Mr. Crole, however, asked for a reconsideration of the Board's order, on the ground that their assumption that the year 1883-84 was not a bad year was erroneous, and the floods in the Voigai in that year were of so terrible and unprecedented a character as to necessitate "dry" remissions everywhere. The Board, however, failed to see the force of Mr. Crole's contention, and were of opinion that he had gone out of his way to recommend dry remission throughout the district, when they were not required, but they would not object to sanction full remission for dry crops actually washed away by floods. Beyond this they were not prepared to go. The Board added that they were constrained to notice the persistent tendency of Mr. Crole to recommend remissions without due reason, and to submit his proposals in an incomplete shape.

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The Government of Madras thought that the state of the Madura district, brought to notice in the papers before them, called for some measure of relief in respect to dry lands. They considered that one-fourth remission should be granted on land ordinarily cultivated, but left waste in the season under reference, as also on land cultivated before 1st October in certain taluks. The indulgence in the case of cultivated land was to be restricted to areas unprotected by wells. The conclusions we draw from these discussions are, that Mr. Crole, although his recommendations were based on good ground, had not taken sufficient pains to submit them in proper form in the matter of detail; while the Board were unduly hard upon him, we think. The Government, however, took the middle—and consequently the safe—course, thereby satisfying both parties.

⁂

We have before us the details of the forecast of the wheat crop in the N.-W. Provinces and Oudh for the month of March 1885. The agency employed was, as before, the Putwari and Kanungo establishments. The method also was the same. Doubtful areas were revised and wrong areas rectified after inspection in the field. The area under pure wheat returned for February was 52,66,319 acres. The area as now ascertained is 52,84,404 acres, or an excess of 18,085 acres over February. This excess is accounted for by the greater accuracy attained in distinguishing fields of pure wheat from those under wheat mixed with barley. A considerable area of land which was really under pure wheat had been wrongly regarded as under wheat *cum* barley. This error was corrected in the March inspections. Hence the excess in area.

⁂

Taking the normal area under pure wheat (49,65,683) at 100, the area as now ascertained is represented by 106. The new feature in the present report is a statement which gives the areas under white, red, and mixed wheat separately. According to the February forecast, these areas were under white wheat 12,11,762 acres; under red wheat, 20,03,643 acres; under mixed wheat, 20,50,914 acres; total, 52,66,319 acres. In the same order we have for March 1885, 12,13,980; 20,10,239; 20,60,185 respectively; total 52,84,404, or as stated before, an increase of 18,085 acres. The difference, however, is not much.

⁂

Mr. D. Smeaton, the Officiating Director, says that his information regarding the condition of the crop was derived almost entirely from non-official sources. 402 selected zemindars and talukdars had been invited to send in returns; and that out of the 402 gentlemen, 360 had sent in returns for March, which reached him punctually, and bore traces of care in preparation.

The weather was seasonable throughout the year. Taking 100 to denote a crop in full average condition, the outcome of the reports sent in by the selected zemindars is as follows:

52,624 acres stand at ...	... 100
6,41,323 " " " ...	... 90
28,03,881 " " " ...	... 84
17,40,481 " " " ...	... 75
42,455 " " " ...	... 66

⁂

The districts had been classified into four tracts, *vis.*—(1) The Meerut Division, (2) Sub-Himalayan Tract, (3) Central and Lower Doab, and (4) Trans-Jumna tract. The standards of outturn adopted for a full average crop in each of these tracts is as follows:—

	Irrigated land. Mds. per acre.	Dry land. Mds. per acre.
I. Meerut	... 18	12
II. Sub-Himalayan ...	... 15	10
III. Central and Lower Doab	... 14	7
IV. Trans-Jumna ...	... 10	4

But a very small area comes up to full average condition. The following estimate of gross outturn has been arrived at in the area as now ascertained:—

	Area under pure wheat.	Estimated full average.	Estimated harvest according to March harvest prospects.
Meerut ...	12,55,015	6,70,955	5,71,211
Sub-Himalayan	25,13,762	11,47,752	9,22,440
Central & Lower Doab ...	13,82,755	6,51,877	5,26,016
Trans-Jumna ...	1,32,872	25,766	21,862
Total ...	52,84,404	24,96,350	20,41,529

The full average crop of the United Provinces may therefore be put down at 2,500,000 tons. Of the outturn estimated for March 1885, the following are the proportions of white, red, and mixed wheats:—

White wheat	... 4,91,884 tons.
Red	... 7,45,185 "
Mixed	... 8,04,460 "

⁂

With regard to the question of obtaining correct information of existing stocks of wheat in the country, Mr. Smeaton has adopted three methods of obtaining estimates, *vis.*—(1) by taking an actual census of existing stocks, (2) by obtaining an estimate from the principal wheat traders, and (3) by estimating the harvests of three or four years back, striking yearly balances of stocks after deducting food consumption, seed, and exports. Thus he found that the wheat harvest of 1881-82 was a poor one. The gross production was not more than sufficient for the food and seed of the people, and for a very limited export during the year 1882-83. That the supplies were scanty is established by the fact that notwithstanding the very limited railway exports (42,28,520 maunds), the price of wheat during 1882-83 was considerably higher than in the previous year (1881-82) when the net railway exports amounted to 52,31,748 maunds, and slightly higher than the succeeding year (1883-84,) when the railway exports amounted to 77,36,389 maunds. It may therefore be assumed that when the harvest of 1882-83 came into the market, the stocks of 1881-82 wheat were exhausted.

⁂

THE crop of 1882-83 was good. According to the estimates of district officers it was a full average one—quoted all over the provinces at from 14 annas to 16 annas. We know the area cropped in 1882-83. Adopting, then, the standards of outturn given above, making the necessary deductions for food, for seed, and for export, it is found that in April 1884 the stocks in hand amounted to 6½ million of maunds, thus :—

Gross outturn of crop of 1882-83 ...		...62¾ millions of mds.
Deduct food consumption	39¾* millions of mds.	
" seed ...	7¾† " "	
" total export ...	8¾ " "	56¼ .. ...
Leaving stocks in hand in April 1884 at		... 6½ millions of mds.

Thus then when, in April 1884, the harvest of 1883-4 came into the market, there were stocks in the country amounting to 6½ millions of maunds.

The crop of 1883-4 was much below average :—

Gross outturn of crops of 1883 84		... 48¾ millions of mds.
Add existing stocks of 1882 83 crop		... 6½ " "
Total ...		... 55¼ " "
Deduct food consumption ...	39¾ millions of mds.	
" seed ...	... 9¼‡ " "	
" total exports	... 4½ " "	53½
Leaving stocks in hand in April 1885 at		... 1¾ million of mds

Computed in this way then the stocks of pure wheat in the United Provinces on the 1st April 1885 amounted to 1¾ million of maunds, or about 64,000 tons.

In order to put this result to the test of facts, the Syndicate of Cawnpore grain merchants were invited to give an estimate of the total wheat stocks in the Provinces. They estimated the total stocks at about 10 lakhs of maunds or nearly 36,000 tons. These gentlemen have agents and correspondents at most of the chief grain marts in the Provinces, and are well qualified to give an opinion in regard to stocks in the hands of the big dealers. But there are considerable supplies stored in outlying villages waiting for a demand to spring up, and of these account must be taken.

In addition to the opinion of the Cawnpore syndicate, enquiries were made in regard to stocks in the following places :—

Meerut district,
Mozuffernugger town,
Aligurh town,
Hatrass tehsil,
Moradabad town,
Shahjehanpore town,
Hardoi tahsil :

and it was found that in these, there are at the present moment stocks amounting to 12,000 tons. Looking to the result of the computation given above, to the opinion of the Cawnpore syndicate, and to the results of the partial census just given, it may safely be said that the stocks of wheat in the United Provinces on the 1st of April 1885, immediately before the harvesting of the 1884-85 crop, amounted to not less than 60,000 tons. This estimate, if correct, should serve as a basis for all future estimate of stocks of wheat in the provinces.

THE cultivation of the mahogany tree (*Swietenia mahogoni*) in the Madras Presidency has been attended with more or less of success, the chief difficulty being found in the delicacy of the seeds, or rather their germinating qualities. We find from the report of the conservator of forests, Southern Division, that the first batch of seeds were received in January 1872 from British Honduras; but their vitality had been quite destroyed. This was ascribed to the manner of packing, *viz.*, in their capsules. The next batch of seeds were received packed in two different ways. The method recommended by Major Beddome was that they should be taken out of the capsules, dried in the sun, and packed in perfectly dry sawdust or charcoal; the other method being to have them in their capsules. It was found on trial that the seeds packed according to Major Beddome's method germinated best; but the success obtained even from this batch was but of a negative kind. The experiment tried with a further batch five years later, also resulted in marked failure, until September 1879, when a lot of seeds received from Jamaica were sown at Nilambur, out of which some 12,000 germinated. From this stage the experiment at Nilambur may be said to have been established.

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THE directions for sowing mahogony seed, issued by the Superintendent of the Royal Botanical Gardens, Calcutta, are as follows, and may be observed as a general rule :—Put the seeds into the soil, so that the broad thick end of each seed shall be lowermost, and let only this part be covered. Leave the thin end sticking out of, and uncovered by soil, keep in a shady place under cover, and water gently. Transplant the seedlings into pots when they are about three or four inches high. Transplant into the situations which they are permanently to occupy, when the seedlings are from fifteen to eighteen inches high.

⁂

AT Nilambur there are at present about 3,000 plants surviving, of those raised from seed received from Jamaica in 1879, including one tree which has survived from the batch of seed received in 1872. This tree is 11 years *old*, 67 *feet high*, and measures 3 feet in girth from 5 feet from the ground. It is a healthy specimen, growing in rich alluvial soil, surrounded by teak trees. Besides the Nilambur plants, experiments have been tried with varying success at Coimbatore, Tinnevelly, Madura, Tanjore, South Arcot, and Chingleput.

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THE method of cultivation recommended by Mr. Morgan is as follows:—

"The plantation should be pitted in May 6' × 6' apart, or 1,200 pits to the acre. In every tenth pit *each way*, which should be 2½ feet cube, the mahogany should be planted and timber trees of the same rate of growth, should be put down as nurses in the other pits. If these latter are not of similar growth, the mahogany is either outstripped and deprived of strength, or it throws out lateral branches too early.

The nurseries for the mahogany and the other trees should be made at the same time, the soil being rich and mixed with leaf mould and river sand, and the beds should be raised from four to six inches to let water run off. The seed should be sown without delay in the manner indicated by the Superintedent, Royal Botanical Gardens, Calcutta, the soil being shaded for the first four days or so with fine grass. The radicle generally protrudes about the fifth or sixth day. After germination, various moths destroy the seedlings, and they must be searched for just below the surface in the mornings and destroyed daily. When the plants are five inches high, they should be potted in rich soil in large bamboo joints to admit of proper drainage, care being taken that the tap roots are not twisted or turned up.

In June, when the south-west monsoon bursts, the plants should be planted in these pots in the larger pits, care being taken that the tap root does not get injured. When the pot has been placed in position, the rich surface soil *alone* should be raked into the pits.

The plants should be staked to prevent their getting "wind wrong,' their stems being protected with rag or grass where tied to the stake. The nurse seedlings can then be planted.

The plantation should be regularly weeded, failures being planted up, and any nurses threatening to dominate may be cut back to the height of the mahogany near them

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* In towns at 2¼ maunds per head ; in country villages at 30 seers per head.

† At 1¼ maunds per acre.

‡ At 1¾ maunds per acre.

There should be periodical thinnings, and after the final one, the nurses may be felled out.

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MR. J. F. DUTHIE, F.L.S., Superintendent of the Government Botanical Gardens at Saharunpore, recently transmitted to Sir J. Hooker, Director of the Royal Gardens, Kew, a specimen of spider silk obtained by him in Kumaon. Mr. Thos. Wardle, of Leek, a well-known authority on Indian fibres and silks, who was consulted regarding the samples, furnishes the following report :—

"Sir George Birdwood has written to me, enclosing some spiders' web and an extract from Mr. J. F. Duthie's letter. He asks me to examine this spider silk and to reply directly to you. The following is the result of my examination :—The fibre is evidently of a silken nature, and, like silk, it is loaded with a gummy substance. In a boiling soap solution this gum or varnish dissolves, leaving the fibre apparently pure and of the nature of fibroin, if not identical with it. Eight micrometric measurements of the diameter of the fibre in different parts of the mass showed great irregularity in thickness (1/2300′, 1/2800′, 1/3500′, 1/2800′, 1/3500′, 1/3500′, 1/3500′, 1/3500′), giving an average of 1/3100 inch. It has therefore a considerably finer thread or fibre than silk, Italian silk averaging in thickness 1/2100 inch. The average strength of the spider silk proportionately is greater than that of silk, a single fibre of the spider silk breaking with an average weight of 2¼ drams avoirdupois, whilst that of China silk breaks at 2⅛ drams. The most curious property of this fibre is its elasticity, which is considerably greater than that of silk ; 30 centimetres of it will stretch to an average length of 36·3 centimetres before breaking, whilst China silk will only stretch to 34 centimetres. Like silk, this spider's web silk is lustrous and has a round fibre. Its coating of gum or varnish is disproportionate to the weight of the silk. On boiling with soap it lost 7¾ oz. per lb.—that is, 1 lb. of the spider silk discharges 7¾ oz. of gum. With silk the proportion is much less, seldom being over 25 to 30 per cent. Before boiling in soap the spider silk was well combed to remove all the dirt possible, but a little remained. The fibre appears to dye readily. I enclose a small pattern of it dyed, and also one as I received it, and one after boiling in soap. I believe if it can be obtained in quantity, it might be packed in bales and sent to England, where it would readily find a market for being carded and spun into silk thread for sewing or weaving purposes. It is difficult to estimate its marketable value. I dare say it would at any rate realize 2s. per lb. It is rather dirty, and this would to some extent detract from its value as compared with silk waste. I have tried to discover how many seripositors this spider has, but beyond noticing under the microscope that the fibres often run in pairs, but not regularly, I am unable to trace whether there are two, as in the ordinary silkworm, or more. Probably an examination of the spider would show this, or an undisturbed portion of its secreted silk."

Mr. Duthie believes that, if a large supply of the spider silk were wanted, it could easily be obtained near the lake at Bhim Tal in Kumaon after the the rainy season is over.

SUGAR CULTIVATION IN INDIA.

THE Government of India in the Revenue and Agricultural Department have very courteously placed at our disposal a mass of correspondence containing statistics of sugar cultivation in India, and other valuable information bearing on the subject. The sugar industry is attracting a very large share of attention at the present time, both at home and abroad ; and as the importance of the subject is generally admitted on all sides, it will be interesting, we believe, to give the public as accurate an estimate as possible of the state of this industry in India, and the dimensions it has assumed during recent years. The Government of India, who called for statistics from the several Local Governments and Administrations, and the territories subordinate to them, would be in a better position to form a correct estimate of the extent of sugar cultivation in India than any other independent authority, and we shall, therefore, here review the official papers placed before us, to do which we shall go back a few years.

In March, 1879, the Secretary of State for India called for a corrected and complete statement regarding the then present state of sugar cultivation, whereupon the Government of India called upon all the Local Governments and Administrations for the information required ; which, when received, gave the area under sugarcane at 1,922,283 acres. In addition to this, there were 168,262 acres under the date palm, 14,100 acres under the palmyra palm, and 2,930 under the cocoa palm, all of which yield sugar ; thus giving a total area under sugar of 2,107,575 acres. This information was sent to the Secretary of State in May, 1882. The circumstance that induced the Home Government to call for this information was the fact of the *Produce Markets' Review* having published certain statistics in this connection, which appeared to require some explanation. It was found that, excluding Bengal, and omitting the area under the date-palm and other sugar-yielding trees, the Indian returns gave 1,737,925 acres of sugarcane in British India, against 1,603,383 acres shown in the *Review* ; and that the conjectural estimate for Bengal of 1,400,000 acres put forward by that journal, was *seven times in excess* of the actual area, *viz.*, 184,258 acres, at which the Government of Bengal returned the area under sugarcane. Bengal, although having an area double that of the North-Western Provinces, has a very small area proportionately under sugarcane cultivation. Thus the vast province of Orissa had less than 4,000 acres, the reason for this being that a large portion of the province is unfitted for the production of sugarcane, being better fitted for the cultivation of rice, jute, and other valuable staples. Nearly half the entire area of 184,258 acres given for Bengal appertained to the Patna division, which adjoins, and resembles in climate and other conditions, the N.-W. Provinces, which is favourable to the cultivation of the cane.

No accurate statistics, however, were then available for the Native States of India ; but from the information received up to 1882, it was inferred that very little sugarcane was grown in those territories. The Rajpootana and Central India States were known to draw their supplies of sugar from the N.-W. Provinces and the Punjab In some parts of the Hyderabad State, however, the sugarcane was one of the staple crops ; but the produce was considered to be probably not more than enough for the requirements of the population. In Mysore, for which the last returns furnished by the Chief Commissioner were those for 1878-79, the area under sugarcane was shown at 12,694 acres, and that under the date-palm at 29,093 acres.

In a despatch to the Secretary of State dated the 16th May 1882, the Government of India observed that the acreage returns for British India may be taken as approximately correct, with the exception of those for Bengal. It was added that the absence of agricultural statistics of a reliable character for this province had been frequently brought to the notice of the Home Government, and was prominently noticed in the report of the Famine Commission. This was a serious charge against the Bengal Presidency, and more than justifies the recent comments made in the public newspapers regarding the unsatisfactory manner in which agricultural statistics were generally obtained by this, the parent Presidency of British India. The Government of India clearly recognised the defective administration of Bengal in this most important respect, and the fact having been recognised, it has always been a matter of surprise to us why it should so long have been excluded from the list of Presidencies under which Agricultural Departments had been established in accordance with the recommendations of the Famine Commission. We have been led into making a digression here from the subject-matter of this article ; but the pertinency of our remarks will be apparent from the following remarkable statement made by the Government of India, when submitting to the Secretary of State the statistical information on the cultivation of the sugarcane. Referring to Bengal, the Government of India said : "It is, however, very probable that the sugar-cultivation of Bengal is understated in the present returns. The estimate made by the Famine Commissioners on the best available evidence, was *over one million acres* ; and though the data on which this estimate was framed are not given, the Commissioners had exceptional opportunities for arriving at a correct conclusion." The italics are ours. When we compare the estimated total area for Bengal as furnished by that Government, *viz.*, 184,258 acres, with the estimate of the Famine Commissioners (who "had exceptional opportunities for arriving at a correct conclusion") who put it down as being "over one million acres," which is 815,742 acres under the mark! we cannot help being somewhat staggered at this extreme disparity between the two figures. We shall abstain from making any further remarks on this point. The two figures are, to use a paradoxical expression, silently-eloquent, and speak for themselves; we shall therefore proceed to take up the next point, *viz.*, the outturn per acre.

We are here in this article, only concerned with a statistical review of the sugar inddstry in India; the economic portion being reserved for a subsequent paper. We thus find that in regard to outturn, the Government of India do not place much reliance on the figures received by them from the several Local Governments and Administrations, and which have been submitted by them to the Secretary of State for India. The figures are avowedly estimates of average yield, which depends not only on soil and climate, but on the character and thoroughness of the cultivation; and the discrepancies apparent in the estimates furnished by the several Local Governments are thus accounted for. For instance, in the North-Western Provinces, where considerable attention is paid to agricultural statistics, the estimated yield in the several districts was variously returned between 15 and 22 cwts. of sugar per acre; for the Punjab a single estimate of 19 cwts. 1 qr. was furnished; while in Bengal, where it is estimated in molasses, the average varied from 6 to 32 cwts.; and from 2 to 26 cwts. when computed in sugar. In the Central Provinces again, the average was actually set down as low as 4½ cwts. But this was thought to be much below the mark. The Bombay Presidency alone presents anything like a uniform average, *viz.*, 19 cwts. per acre of sugar, although the district returns were said to be as conflicting as those for Bengal. The explanatory notes, however, which accompanied the figures for the various provinces, showed that the statistics of produce were to be received with caution; while those in the case of Bombay furnished strong evidence that the statistics of produce supplied by the village officers were much under the real truth. Owing to the various ways in which raw produce is disposed of, it was found exceptionally difficult to obtain satisfactory estimates in the case of sugar cultivation. The marked discrepancies observable in this connection may be explained to some extent by the fact that the greater portion of the sugar produced in India never goes beyond the unrefined state; and in estimating the average produce, it is usual to refer to sugar of this class, except in cases where the estimates are extremely low, when the outturn in refined sugar has been taken.

(*To be continued.*)

THE DISTRESS IN BURDWAN.

A CORRESPONDENT of the *Indian Mirror*, writing on the scarcity prevailing in the Burdwan district, says that, owing to the increased number of applications for relief, the means at the disposal of the Committee formed in Burdwan, are fast ebbing away, and appeals, under the circumstances, to the "rich and generous of this country, in the earnest hope that they will kindly come forward to rescue from starvation and death, thousands of fellow-human beings who are at present plunged by a dreadful visitation of Providence into the most intense sufferings." As some persons, to whom applications for aid were made, refused, on the ground that they "had already sent contributions to the district officer, who is the proper person to distribute charitable relief in his district," it is explained that the Committee, who are composed of the leading gentlemen of the town of Burdwan, have been distributing aid principally through the officers of the Government, who have been employed specially upon relief work. The rule of Government limits the supply of Government relief either to persons who are willing to work upon Government roads, or to persons who have no objection to partake of cooked food. There is no fund for the relief of people who, by reason of their caste or social position, are precluded from availing themselves of either of the aforesaid two modes of relief. The fund at the disposal of the Committee is intended for these people; and the Government relief officers being on the spot, are best able to ascertain the cases in which the pecuniary aid in the gift of the Committee can, with advantage and propriety, be applied. The Committee, in certain cases, send money for distribution by the hands of respectable gentlemen, who go round from village to village administering relief to deserving cases. The accounts, which are brought in by these gentlemen of the depth of suffering and destitution to which the majority of people of many villages have been unfortunately reduced, are touching in the extreme. Hundreds of people are eager candidates even for the one-half pice a day, at which rate the limited means at the disposal of the Committee now enable them to dispense relief. The total amount, now in the hands of the Secretary, is only Rs. 1,100, and considering the distress, is sure to be intensified during the next three or four months, and that the number of people standing in need of relief must be considerably more than at present, it is quite clear that the aforesaid amount can last but for a short time more only. We earnestly commend the appeal made by our contemporary, to all our readers who have the means of helping the sufferers in this extremity. Our own belief is absolute, and has ever been so, that in the absence of a poor law in India, the Government itself should furnish all the funds required in these extremities, imposing if necessary a casual tax for the purpose. We cannot wait however to press these counsels on the State, but urge all who have the means to contribute at once to the failing funds of the Committee.

THE LONDON EXHIBITION.

A RESOLUTION of the Bengal Government, published in the supplement to the *Calcutta Gazette* of the 13th instant, suggests the preliminary questions for a Committee appointed by the Lieutenant-Governor, to consider the best means of concerting measures to represent the Bengal Presidency at the London Exhibition of 1886. A sum of Rs. 20,000 will be placed at the disposal of the committee for this purpose, whose duties will be confined to the equipment of the Provincial Court, illustrating art ware, ornamental fabrics, and decorative work of Bengal, and to the executive duty of receiving and forwarding either to the Government of India, or to the Royal Commission, applications for space by private exhibitors resident within the province. In view, however, of lightening the burthen upon the Provincial finances, it has been decided to utilize the exhibits for the London Exhibition at the Bombay Exhibition of 1887, without making any special collection of fresh ones, or a separate allotment of funds. Should any of the exhibits be sold in London, duplicates will be prepared for Bombay. Apart from the articles to be collected locally, the chief ornament of the Bengal Court will consist of screens, showing the characteristic styles of Bengal architecture, or the features and peculiarities of the decorative arts of the country. For this purpose, a separate grant of Rs. 1,500 has been sanctioned, which, if insufficient, may be increased by taking from the grant of Rs. 20,000, should the Committee think necessary. According to the recent Resolution defining the functions of the Agricultural Department of Bengal, the organization of such exhibitions would form one of the duties of the Director; but in the present instance, the pressure of work, necessarily accompanying the formation of a new department, will render it impossible for him to undertake these duties without assistance, hence the appointment of a Committee consisting of ten members (with whom the Director is associated), with Mr. H. A. Cockerell as President, was found to be necessary. The President is to arrange to hold a meeting as early as possible, to decide all preliminary questions, and to start work throughout Bengal, as all articles for exhibition must be ready for despatch by the 25th December 1885.

TRADE BETWEEN RUSSIA AND CHINA.

THE following very interesting article appears in a Russian paper called the *Journal of the Ministry of Finance*, which gives a fairly accurate idea of the conditions of trade between the two countries. The information is said to be derived from the most recent sources:—

> "That State, including all its dependencies, covers an area of 10½ millions square versts. The 18 provinces forming what is called China Proper embrace no more than three million versts of this surface, and their population is 362,400,000 inhabitants, while that of the whole empire reaches to about 382,000,000. As a matter of fact, almost the whole commercial and industrial life of the Empire is contained in the thickly-peopled provinces which are close to the sea; the provinces near our possessions on the Amour and in Siberia, or stretching into the interior of Asia, do not enjoy as favourable a situation. The northern province of Manchuria contains 3,000,000 persons; the Mongolian steppe, 2,000,000 nomads; Kashgar and Kuldja have been almost depopulated during the recent wars. Tibet has 6,000,000 inhabitants, and Corea 8,000,000. The seaports of China provide a residence for 4,000 Europeans; and there are about 340 foreign mercantile firms, of which more than

half are located at Shanghai. At Khanko and Tientsin there are eight Russian houses engaged in the tea trade and in the preparations of brick tea. Along the northern coasts of the Empire as well as in Kuldja, Kashgar, Chuguchak, and Ourga, a few Siberian merchants may be met with.

"Industry, although essentially different from that of Europe, is extremely flourishing throughout the whole of Central China. The methods still in use are those that were employed 2,500 years ago. The use of machines and other technical appliances is altogether unknown; small farms form the bulk of the agricultural distribution; each plot of land is manured like a kitchen garden. Vegetables are generally cultivated, as also are rice, wheat, and barley. Tea, cotton, silk, and sugar represent important articles of commerce. Industry yields place, however, to agriculture although manufactures—silks, porcelain, various kinds of carved wood works as well as mats enjoy generally a high reputation. The neighbouring countries of China, properly speaking, are distinctly behindhand in point of industrial prosperity. With regard to the state of revenue, it is difficult to ascertain the exact amount in a country where the Governor of each province raises what he wishes or what he can, and expends much on local requirments. The revenue actually sent to Pekin would not amount to more than 75,000,000 roubles. By assuming the total receipts to be double that sum, it would be found that agriculture alone contributed about 60,000,000. We know exactly the amount of the customs received from the 22 seaports open to foreign trade. In 1864 these exceeded 13,000,000 roubles; to day, they are about 25,000,000. The expenditure is only known with little exactness. It is supposed that the sum annually spent on the army amounted to 100,000,000 roubles, while that on canals reached the sum of 8,000,000. In order to cover the deficits which had arise recourse was had to a foreign loan in 1874 on the guarantee of the customs. The internal commerce is carried on chiefly by water-routes. Many thousands of boats are employed in navigating the rivers and canals. There are also numerous carriage roads, the best of which, crossing the Thian Shan range, connects China Proper with Kuldja and Kashgar. With regard to the commerce between Russia and China, it is carried on both by land and by sea. Within the last five or six years the sea traffic has increased owing to the efforts of the patriotic fleet. In 1882, 245,000 poods of tea were transported to Moscow by way of Odessa. The land trade passes for the most part through Kiachta. After describing the different treaties concluded between Russia and China, within the last 200 years, the *Journal* states that, whereas in 1800 Russia only received 80,000 poods of tea per annum, in 1855 the amount had risen to 225,000 poods, and in 1883 it was not less than 913,000 poods. With regard to Russian exports into China, there has, on the other hand, been a great falling off. In 1855 the exports amounted to 6½ million roubles; while in 1881-3 they had fallen as low as 2½ millions. Trade with China presents great difficulties. The Government is obliged to come to the help of our merchants. It is with this object that more than one expedition into the Celestial Empire has been sanctioned, that new Consulates have been established, that the routes, in the border provinces have been improved, and that shorter routes have been sought for. It is with the same object that quite recently credit establishments have been opened at both Tashkent and Vernoe."

THE RUMOURED INCREASE OF THE DUTY ON TEA.

We publish below the representation recently addressed by the Indian Tea Districts Association to the Chancellor of the Exchequer, on the subject of the rumoured increase of Tea duty, and of the reply that has been received.

THE INDIAN TEA DISTRICTS ASSOCIATION.

To the Right Hon. C. E. Childers, M. P., Chancellor of the Exchequer, &c., &c.

SIR,—The rumour that the increase of the duty on Tea may form part of the impending fiscal adjustments of her Majesty's treasury, has produced a feeling of uneasiness and anxiety on the part of those interested in the growth of tea in her Majesty's Indian Dominions. While the Association trust that there is no truth in this rumour, they nevertheless feel it necessary to offer a respectful remonstrance against a step so prejudical to the interests of the Industry they represent.

The existing duty of 6*d.* per pound amounts to over 70 per cent of the market value of the teas imported from all countries, and constitutes a distinctively onerous tax on a commodity of such universal consumption in this country as to be justly regarded as one of the prime dietary necessaries of life.

To further enhance that rate cannot fail to entail considerable hardship on a large section of the community already suffering from the effects of industrial depression and diminished earnings. It must also tend (more specially under these conditions) to restrict consumption, and thereby partially defeat the object aimed at.

The effect of the increased duty upon the Indian Tea Industry, there is every reason to apprehend will be seriously detrimental. That industry has been for a long time past in a depressed condition, requiring great energy, perseverance, and economy on the part of those interested to maintain the enterprize and prevent a collapse.

The Indian Tea Industry has now attained to large dimensions, representing an investment of capital little short of 16 millions sterling, and contributing during the past year 67 million pounds of Tea to the Imports of this country, and upwards of 1½ millions sterling to the Revenue. It has been the means of bringing under cultivation immense tracts of land hitherto unproductive; affording well paid employment to a vast number of labourers, and diffusing a most beneficial influence on the general well-being of the people, as well as adding substantially to the revenues of the Government in the districts in which it is prosecuted.

As a matter of fact Tea already pays an enormous duty, equal, in the case of at least a moiety of the import, to as much as the prime cost of the articles.

It certainly seems to be an anomaly in our system of taxation that a pound of tea from Free trade India, valued at 12 pence in Bond, should be taxed at 6d, and that a bottle of Champagne from Protectionist France valued at 5 shillings in Bond, should be taxed only 2 pence.

The effect of any increase of duty would be that the poorer classes of the community, being unable to pay more than they do at present, would have to be content with an inferior article, and as the inferior qualities are largely produced elsewhere, the sale of the produce of India would be seriously prejudiced.

Looking to the importance of encouraging to the utmost the great efforts which are being made to promote habits of thrift and temperance among the people, any measure calculated to curtail the consumption of tea would undoubtedly tend in a great measure to neutralise those efforts, and on this ground also is greatly to be deprecated.

We would further submit that in view of the fact that British manufactures are now allowed to enter India duty free, it is manifestly unfair that the mother-country should impose further burdens on the products of her great Dependency.

On behalf of the Indian Tea Districts Association,
(Signed) T. DOUGLAS FORSYTH, Chairman,
EARNEST TYE, Secretary.

March 18, 1885.

Treasury Chambers, WHITEHALL, S.W., 27th March, 1885.

Sir,—I am desired by the Chancellor of the Exchequer to acknowledge the receipt of your letter of the 18th instant on the subject of the Tea Duty, but he feels sure that your Association will not expect him to discuss rumours in the press with reference to the forthcoming Budget.—I remain, Sir, your obedient servant,

J. M. CARMICHAEL.

Sir T. Douglas Forsyth, K. C. S. I., C. B.

Miscellaneous Items.

THE heavy rainfall prevented the annual Simla outing to the Sipi Fair.

FOOT-and-mouth disease has broken out amongst the siege-train bullocks at Ferozepore.

THE Saharunpore Horse Show for 1885-86 will be held on the 23rd, 24th, and 25th February 1886.

DURING the month of March last, there were 143,491 births registered in the North-Western Provinces and Oudh.

WE understand that Mr. G. M. Barton has been appointed Provisional Secretary to the Chamber of Commerce, in place of Mr. Rutherfoord, deceased.

THE Conservator of Forests, Bengal, has been appointed an *ex-officio* member of the Central Examination Committee, Calcutta.

THE weather at Simla, we hear, is quite abnormal—rain falling constantly, as though the *chota bursat* had set in before its time.

THERE has been very heavy rain at the Himalayan settlements during the past week, especially in the neighbourhood of Simla and Mussoorie.

THE Government has sanctioned the expenditure of Rs. 826, for constructing a permanent shed for the blacksmithing branch of the Madras Industrial School.

UNSETTLED weather prevails throughout the Punjab accompanied with rain. It is likely to cause much damage to the wheat crops, which are being winnowed.

THE weather in Nepal of late has become cooler and more seasonable, and 2·86 inches of rain have fallen. The prospects of the crops, however, continue only moderate.

THE *Gujrati* says that his Highness the Maharaja of Baroda spent about a lakh of rupees for charitable purposes on the occasion of the death of his wife Chimnabai.

ACCORDING to a Simla correspondent, Mr. Ney Elias, accompanied by Mr. Carey, the Salt Commissioner, starts shortly for Ladakh. Mr. Carey will make for Yarkund.

LIGHT showers of rain fell at Pondicherry on Monday night and Tuesday morning, last week, and appearances indicate a further fall. Vegetation sadly requires rain, and the tanks are fast getting dry.

THE increase of low fever at Poona is attributed by a local paper to the extension of sugar-cane cultivation, which had led to a good deal of land in the neighbourhood being turned into swamps.

CHOLERA of a virulent type has broken out at Nassick. During the past fortnight, 75 persons have been attacked and 45 have died. The authorities are doing their best to stamp out the disease.

The revised estimate, amounting to Rs. 91,000, for diversion of the Buckingham canal from Coromandel to Thattupet, is sanctioned in supersession of the estimate of Rs. 90,000 included in the completion estimates of that canal.

Mr. H. S. Thomas, First Member of the Board of Revenue, Madras, is shortly going to Tanjore to make a local inquiry and report upon the claims of the ryots of that district for remissions consequent on the adverse season of the last year.

Mr Hepburn, a coffee planter of the Kadur district, has contributed the skin of a huge rock snake, a two-headed fish, and a bird of paradise to the Mysore Government Museum, where these curiosities may be now seen by visitors.

The mortality returns for the month of March show that the total deaths from all causes aggregated 82,841, compared with 71,609 in the previous month, and 121,099 in March of last year. Fever of sorts accounted for the deaths of 67,359 persons.

The inhabitants of several villages in the Kolapore Collectorate were startled on the night of the 29th ultimo between the hours of ten and eleven by a slight shock of earthquake, which at its most extreme vibrations had the effect of shaking the tiles off several buildings.

The latest news from the tea districts is that rain has been generally plentiful, but a higher temperature is wanted in many parts to bring out the flushes. The many hailstorms that have occurred in Cachar have not done much damage, except to a few gardens.

The *Madras Times* says:—The expected fiat for reductions has come from the Government of India, at least so far as regards the Irrigation Branch of the P.W.D., where orders were received lately for a curtailment of expenditure by two lakhs of rupees in the current year's Budget allotment.

The water famine is at its height in Bangalore. The population of the town, especially in Mamulpetta and Siddicutta, are put to very great straits for a daily supply of water, and have to travel out to great distances to obtain the fluid. The authorities have not devised any efficacious remedy.

It has been definitely ruled that the inspectorships and other subordinate appointments under the new Excise arrangements are to be conferred exclusively upon the natives of the country. The Commissioner of Pegu strongly recommends that good Burmans from the ranks of the police force be selected for the posts.

At the annual festival held at Mangalagiri, Guntur taluk, Kistna district, held on the 21st February to 3rd March, there were about 8,000 pilgrims present. Three cases of injury were taken to the hospital sheds, two of them resulting from the wheel of the car passing over the patients' legs, and which necessitated amputations.

There are several farms at Mangerie, belonging to and worked by East Indians They are in a flourishing condition, and are considered profitable investments by the owners. It is a matter of some surprise, that some more pensioners do not purchase and work land, thereby diverting the ambition of the rising generation from everlasting desk-work.

The Secretary of State has wired that the New South Wales Government has offered its services in procuring supplies of preserved meats, live-stock, cattle and horses. All Local Governments and Army Departments have accordingly been directed to resort to the Colonies, where stores or supplies can be procured as cheaply and as expeditiously as from England.

A correspondent writing to a contemporary from Gwadur on the 2nd instant, says:—"Reports from the interior show that much damage has been done to property by floods and the overflowing of the river Ketch Kowe. Some fifteen lives have been lost, and the villages of Halighy and Syob have been washed away. It is said that about 20,000 date trees have been blown down."

Incendiarism is very frequent during these hot months. But it seems strange that in Government offices and establishments which are well guarded, it should prevail. Some time ago the settlement records in the Collector's office were burnt, and on Friday last, the 1st instant, the Money Order and Registration branches of the Post Office at Sikraul caught fire, and nearly all the records were destroyed.

The Economic Garden at Hyderabad Sind bids fair to become self-supporting in a year or two. It produces splendid grape, and our Hyderabad correspondent informs us that its fruit has been recently sold for Rs. 3,000 to Devji, a Kurrachee contractor. The vegetables produce about Rs. 1,000 or 1,500. The cost of the Garden is Rs. 6,000. It has been very much improved of late, and is well worth a visit.

A correspondent writes to us from Gwadur:—"A huge sea monster was lately discovered on the seashore at Sahar. For many days the residents of the place were in great fear and trembling in consequence of the uproar caused by the monster. After some days the noise ceased, and a great monster, lying motionless, was found. It had ponderous wings. It measured ninety feet in length from head to tail. The people have been busily engaged in converting it into oil."

A scarcity of water prevails on some portions of the line of the Nizam's State Railway, which has caused almost a block in the traffic. The water for the engines has to be brought in iron tanks from some distance by railway, and this, as may be imagined, is attended with great expense and delay. Mr. Howard Warden, the energetic Traffic Manager, is doing his best to remove this difficulty, and the public has every confidence in his ability to meet this emergency.

A Kurrachee paper states that the octroi on piece-goods has at last been abolished. It was proposed to make up for the loss of the income by imposing town duties on kerosine oil, matches, articles of metal, &c., and a water rate of 2 per cent on houses. The Municipal Commissioners, however, refused to sanction any fresh town duties except on stone, anyline dyes, cheroots, and a few other articles. The proposal to charge a donkey tax at the rate of Rs. 1 8 per head was modified by the reduction of the rate to Re. 1.

We notice that the Municipality are engaged in deepening two large holes in the bed of the Ulsoor, on the Sapper side, so as to convert them into temporary wells. Some precaution should be taken to fence the holes round to guard against accidents. During the famine five of these holes were sunk in the bed of the tank, and several people, mistaking them for shallow pools, fell into them and were drowned. The late Mr. Coopoo Chetty came by his end in this way. On one occasion a cart and pair of bulls fell into one of the holes, and the bulls got drowned.

The present scarcity of water is becoming apparent in the small quantity of vegetables now brought in the market. The high prices asked for cabbages, for instance, retards their ready sale, and the heads are becoming "small by degrees and beautifully less" in point of size, as the vendors are compelled to pull off the outer drying leaves of the cabbages remaining unsold, to make them look fresh on being brought into the market the following morning. It is supposed that if the present drought continues, few if any vegetables will be sent on to Madras, unless at fancy prices.

Selections.

GENERALLY ADMITTED FACTS WITH REGARD TO THE MANUFACTURE OF TEA.

[The following paper has been kindly placed at our disposal for publication. It was found amongst the late Mr. Cameron's papers, and appears to have been the maxims which he had acquired during his lengthened experience of tea-making in India. They are of peculiar interest to all planters in *Ceylon*, as the framework on which Mr. Cameron based the teaching that had so powerful an effect for good throughout the island. It will be seen that they refer *only to hand manufacture.*]

1. Leaf is best withered when there is free supply of light and cool air.
2. Wet leaf is better withered in the sun or in the wind than by artificial heat.
3. Dried leaf is not necessarily withered leaf.
4 Under-withered leaf breaks in the roll.
5. Over-withered leaf gives most Pekoe tips.
6. Leaf withered in the sun gives red tea.
7. Under-withered leaf gives a green, and over-withered leaf a dark, outturn.
8 A bright coppery-outturn can only be obtained from well-withered leaf.
9. Under-withered leaf will take longer to fire than well-withered leaf.
10. Low rolling tables cause the leaf to get broken. Anything under 3 feet high is objectionable.
11. If sap comes too quickly in the roll, it shows that the leaf required more withering.
12. Too much sap makes a knobby tea from the leaf getting into lumps.
13. Small leaf cannot be successfully separated from the large before rolling.
14. Heavy rolling destroys the flavor of the small leaf, but improves the strength of the large leaf.
15. Heavy rolling discolors the Pekoe tips.
16. Coarse leaf requires all the rolling it can get.
17. Contact with iron blackens the roll.
18. The roll will color in any temperature, be it higher than, equal to, or lower than, that of the tea-house.
19. In a higher temperature than that of the tea house the color comes quickly; in a lower temperature much slower.
20. At some period of so called "fermentation" the roll gets warm. In the present state of our knowledge there is no certainty whether to check or encourage that warmth.
21. The roll gets blackened by contact with the air and colors more evenly covered up.
22. Coloring in balls is uneven. Roll spread out over three inches to color gets mawkish.
23. The fermentation proper cannot be brought about without heat. Teas coloured in a temperature below that of the tea-house are not "fermented" in the real sense of the word. "Oxidation" or "coloring" expresses the process more correctly.

24. There is no fixed time for coloring; the proper point is determined by the eye.

25. There is no chemical or other test in use to determine the point at which to stop the coloring.

26 The color of the roll immediately before brisk firing is about the color of the outturn which will be found in the cup.

27. Pungency or rasp and a light liquor accompany a green outturn.

28. Thickness and a dull liquor attend a dark outturn.

29. Over-coloring produces a soft tea.

30. Care given to the withering ensures good color, care given to the roll ensures strength, but care will not ensure flavor.

31. In the present state of our knowledge there is no method by which flavor can be fixed.

32. Leaf opens out during the coloring and requires re-rolling.

33. Heavy re rolling before firing softens the tea. A light pressure to excite a little moisture gives the twist and the polish required.

34. Drying in the sun gives a black and tippy tea.

35. Tea dried in the sun cups out with a metallic taste.

36. Coloring and softening go on rapidly over slow fires, and are checked by all aglow fires.

37. Quick firing gives a brisker tea than slow firing.

38. The roll spread thick on firing trays gets stewed and dull.

39. The roll has been spread too thickly when the fire cannot be seen through the contents of tray.

40. When three-quarter fired, about half an hour, trays can be safely filled up four deep, and the curing finished over slow fires.

41. Choolas can be constructed to consume one maund of charcoal, or less to one maund of tea.

42. Pucka battying develops nose or aroma.

43. Drying in the sun before packing completely desiccates the tea, but gives it a peculiar flavour.

44. Bulking is better before than after pucka battying to ensure the teas being packed hot.

45. Iron-wire, brass-wire, or bamboo trays are all good for firing, but the two former are better conductors of heat than the bamboo ones, and not liable to get out of mesh.—*Ceylon Times.*

LIGHT GRAZING IN THE BERAR FORESTS.

(*Indian Forester.*)

The following statement shows the financial result of the scheme for light grazing introduced last rainy season into the State Reserves of the South Berar and Wun Divisions.

Sanction to the scheme was not received in time to admit of full advantage being taken of it by large cattle owners, many of whom had made other arrangements for grazing—some by sending their cattle elsewhere, others by purchasing waste lands under the Survey and Settlement Rules. The scheme has, however, been greatly appreciated, and there have been few or no difficulties in working it. It has also proved a decided success so far, and it is expected that next year the full area allotted to each head of cattle will be everywhere worked up to.

The following extract from my inspection report on the South Berar Reserves describes the appearance of the forests after they had been grazed:—

"*Light Grazing.*—I was agreeably surprised to notice the small effect that light grazing had had on the crop of grass. In most places an inexperienced person would hardly have observed that grazing had taken place at all. The grass appears to have grown almost as quickly as it was eaten, and there is still a sufficient supply left on the ground to meet all possible requirements.

"*Natural reproduction in localities lightly grazed.*—It was also a matter of satisfaction to me to notice that natural reproduction was much more plentiful in places that had been lightly grazed than in completely protected localities. This may be accounted for in great measure by cattle treading seed into the ground, and also by fewer seedlings being smothered by a rank growth of grass.

"The same result is observable in places where broad cast sowing of teak seed has been made."

In consideration of these satisfactory results, I would now beg to recommend that light grazing be extended to the whole area of the reserves, but to further protect forest interests in case of a partial failure of the rainfall, and there not being so luxuriant a crop of grass in the reserves in consequence, the area allotted to each head of cattle should be increased from 2½ acres to 3 acres.

This year in the heaviest grazed reserves, *viz.*, Ghat Bori and Rui, where the allotment per head of cattle was 2·6 and 2·5 acres respectively, considerably more grazing might have been permitted without injury to the forests, and therefore, if the allotment is increased to 3 acres, there should, I think, be no fear of over-grazing in a year of scanty rainfall.

I would also recommend that buffaloes be excluded in addition to sheep, goats, and camels, as these animals are liable to browse on the young shoots of trees at the commencement of the rains, as well as to injure trees by rubbing against them when tormented by flies and other insects.

It will further be necessary, for obvious reasons, to strictly forbid grazing in localities where fires have occurred in the previous dry season.

Amongst other advantages which light grazing in reserves has brought about, I would mention the beneficial effect it has had on the neighbouring district forests, which do not show nearly so marked signs of being overgrazed as they did last year, and this improvement will be still more noticeable when additional cattle have been admitted into the reserves.

When the system of light grazing has been given full effect to, it should be possible to reduce expenditure on fire conservancy very considerably. Line burning should not cost so much, and fewer fire-path watchers should be required; and in case of accidental fires occurring, the extinguishing of them should be a matter of comparative ease.

I have every reason for hoping that the introduction of light grazing into State Forests will be the means of solving the difficult problem of how best to reconcile the interests of the ryot in the matter of grazing with those of the Forest Department in the restoration of the areas committed to its charge.

By excluding sheep, goats, buffaloes, and camels—the animals most destructive to forests—and limiting the head of other cattle permitted to graze, the Forest Department prevents all possibility of serious injury occurring to its reserves, whilst it, at the same time, confers an immense boon upon surrounding villages by providing extensive grazing for the greater portion of their cattle. The grazing too is given at the time of year when it is most valued, *viz.*, from the commencement of the rains till the end of October. After the *kharif* crops have been reaped at the commencement of the cold weather, cattle in Berar are, as a rule, withdrawn from their grazing ground, and fed on the stubble, &c., left in fields, supplemented by the leaves and stalks of "jowar."

When grazing for a limited number of cattle is provided in State Forests, the taking up of these areas will cease to be looked upon by the rural population as a sudden and complete reduction of their grazing grounds:—

Reserve.		Area of reserve, in acres.	Area open to grazing, in acres.	Number of cattle admitted	Area per head of cattle, in acres.	Revenue realised.		
						Rs.	A.	P.
Gerumatergaon	...	45,992	22,996	4,912	4·6	1,352	12	0
Ghat Bori	...	29,235	14,617½	5,596	2·6	1,473	0	0
Amduri	..	13,717	6,858½	1,469	4·6	425	8	0
Penganga...	...	11,575	5,787½	946	6	226	12	0
Rui ...	...	6,647	3,323½	1,312	2·5	363	0	0
Kelapore ...	..	40,747	20,373½	2,229	9	418	11	0
Gondwakzi	...	16,359	8,179½	2,324	3·5	573	4	0
Khorad ...	...	16,117	8,058½	585	13·7	114	3	0
Patroat ...	...	2,889	1,444½	337	4	78	2	0
Lontebel ...	...	8,966	4,483	1,588	2·8	312	2	0
Anjan Kheir	...	7,634	3,817	890	4	193	5	0
Total	...	199,878	[illegible],939	22,183	4·5	5,535	11	0

A. T. Drysdale,
Conservator of Forests, Hyderabad Assigned Districts.

TIMBERS OF UPPER ASSAM.

By Chevalier Roberto Paganini, *late Chief Engineer, Makum Division, Assam Railways.*

It will be easily understood that in a country where the temperature of the plains and low hills never falls below 45 degrees F., and never rises above 100 degrees F., with an average rainfall of 120 inches a year, vegetation cannot but be of the most luxuriant character and extreme variation. In fact, one of the characteristics of Upper Assam is its interminable jungles constituted in places by thick forests of colossal trees, and in others by impenetrable cane or bamboo groves.

As a rule, cane jungle will grow in swampy ground where water lodges for several months, and sometimes all the year round. Bamboo jungle will grow in low lands flooded occasionally, but where the water does not remain for any length of time. Forest jungle generally grows in dry soil, and one or other of any special tree seems to prevail according to the different altitude of the ground, or perhaps it would be better to say according to the different degree of moisture retained by the soil. The prevalence, however, of any special tree is by no means strikingly apparent. In spite of favourable ground, and the gregarious tendency of nearly all forest trees, it seems that a great variety will grow and flourish side by side in a way which would seem quite incongruous in our country. The only clear fact in these forests is the total absence of certain species of trees under peculiar circumstances. Thus, Nahor and Makahi, as will be seen hereafter, are never found in low lands, especially if subject to occasional floods, while Uriam and Hollock are never found in high, well-drained land. However, as a rule one may stand in one of these forests surrounded by trees growing as thickly as possible, and he will find it difficult to detect half-a-dozen trees of one species. This fact considerably enhances the wild beauty of the Assam jungles, but it has been up to the present time a great drawback, from a mercantile point of view, to the proper utilization of the timber. For the purpose of collecting one kind of timber it necessitates going a great distance through untrodden jungle, and after having found and cut it to the smallest size, elephants are required for the purpose of dragging it off. This process, of course, causes a large portion to be wasted, which under other circumstances would be very valuable.

The Assam Railways and Trading Company, amongst other concessions, obtained from the Government of India, have the monopoly of the timber trade for 1½ miles along each side of their line, which runs from Makum Junction to Margherita (a distance of 23 miles), and the specimens on view at the Health Exhibition came from these forests, which extend, practically, uninterruptedly from end to end of the above-mentioned portion of the line.

When the Company first commenced work in opening out the country, little or nothing was known as to the real value of many of the timbers, and as the Company's works depended so much on them, they had to start at the beginning, and thus acquired an amount of information which will prove very valuable for the future of the timber trade of that country.

The following is a description of the various specimens exhibited :—

Mesua ferrea.—Assamese name, Nahor; English, Ironwood; specific gravity, 1·23 ; co-efficient of rupture in cwt, and decimals, 27 9 ; loss of weight when chemically dried, 25 per cent.; maximum shrinkage due to above operation, 8 per cent.

There are some good patches of almost exclusively Nahor trees to be found here and there, growing on high, well-drained ground, but they are not extensive. The stem is generally straight, and the average size is from 25 feet from the foot to the first branch by 5 feet girth, maximum height found 45 feet from foot to first branch, maximum girth 12 feet 6 inches. The branches are generally thin and of no use as timber, but they produce excellent charcoal and make first-class firewood.

The timber is of a deep red colour, with very close undulating fibre, rather brittle, warps and splits when cut into planks or small scantling, heartwood not attacked by insects of any kind, and stands almost indefinitely, both exposed and under cover, without deteriorating. Before being used it should be stripped of all its sapwood, and thus prepared, forms an invaluable material for bridge piles, beams and thick scantling generally ; in fact, it serves almost as a substitute for cast-iron.

Artocarpus Chaplasha. Assamese name, Sam ; English, Monkey Jack ; specific gravity, 0·63 ; co-efficient of rupture as above, 12·3 ; loss of weight in chemical drying, 32 per cent ; maximum shrinkage due to above process, 5 per cent.

This tree does not seem to have a preference for any particular ground ; it grows in low land with as much vigour as upon the hills. It is never found in patches, but is liberally scattered all through the jungles. The stem is seldom very straight and branches off soon, sometimes at a few feet from the ground, but the branches often produce good timber. It is of a bright yellow colour when cut, and deepens into a brown walnut colour in the course of time. The fibre grows pretty straight, not very close, breaks short, and receives easily a clean polish. It warps and splits very little. It stands well either exposed or under shelter, and insects will not attack it. It is a very useful timber for any purpose where great strength is not required, being specially adapted for household furniture, as it is equal or superior to teak for this purpose.

Bischoffia Javanica—Assam name, Uriam; English, none; specific gravity, 1 04 ; co-efficient of rupture as above, 15·2 ; loss of weight in chemical drying, 24 per cent ; maximum shrinkage due to above process, 10 per cent.

It grows abundantly, though never gregariously, along the banks of the rivers in the low plains, and preferably where occasional floods cover the ground. It sometimes grows straight, but not generally so. Thick branches soon divide the stem, and yield useful timber. The girth of the stem varies very much, and the timber obtained from one of 4 feet girth seems to be as good as that obtained from a 12 feet girth (which size is not uncommon). The timber is of a dark cold red colour, the fibre straight and close, and hardly recognisable ; it warps and cracks under shelter, and if the place is very dry becomes very brittle. White ants will attack it. On the other hand, it is almost imperishable in wet ground or under water. This circumstance makes it particularly suited for pile foundations and railway sleepers. And for this latter purpose especially, we believe, considering the present prohibitory prices of other wooden sleepers in India, it will soon become very useful.

Terminalia Myriapteron.—Assamese name, Hullock ; English, unknown ; specific gravity, 1·06 ; co-efficient of rupture, as above, 13·4 ; loss of weight in chemical drying, 35 per cent ; maximum shrinkage due to the above process, 2 per cent.

This tree grows under the same circumstances as the Uriam, and almost invariably where Uriam is to be found Hullock is also found ; it is not so abundant as the former, but grows to a much larger size, and shows a gregarious tendency here and there. Although branches are often to be seen starting a few feet from above the ground, it possesses generally a long stem growing to a considerable height, and the branches yield good timber. It is frequently recognised by its towering above the surrounding trees. The stem also grows to a great thickness, 10 feet to 12 feet girth being the ordinary size, but one on being measured was found to be 21 feet girth. The timber of young trees is almost valueless, as not only is it greedily attacked by the carpenter-beetle and other insects, but soon deteriorates when exposed to the climate. On the contrary, the timber of the maturer trees is excellent for many purposes, straight grained, pretty hard, of a brown colour, does not warp or split to any considerable extent, even when not seasoned, stands well in and out of doors without deteriorating. Its only enemy is a kind of small borer, which is easily got rid of by painting it with crude petroleum or coal tar. It is peculiarly adapted for cheap furniture, windows, doors, railway carriages, and generally for any work where accurate fitting is the main object.

Dipterocarpus Pilosus.—Assamese name, Hollong ; English, none. No experiments have been made on this timber. It grows in high well-drained land, is not gregarious, but is pretty thickly scattered about. Its stem is very straight and attains a very large size, averaging 8 feet girth and 60 feet to 50 feet from foot to the first branch. Instances of 18 feet girth by 90 feet to the first branch are not unfrequent.

The timber is of a reddish-brown colour, close and pretty straight grained ; it does not warp or split much, but quickly deteriorates unless kept in a dry and ventilated place ; is attacked by nearly all timber insects. Thus, notwithstanding its large size, it is of little or no use, except for temporary purposes and for packing boxes ; it must, however, be borne in mind that in Assam this latter use forms a very important business, as not less than 400,000 boxes for packing tea are used yearly, the making of each one requiring about 1·50 cubic feet of rough timber. A large quantity of such boxes are now imported from Calcutta, and the balance is made by hand saw, and a few sawmills, which are busily engaged exclusively in that trade all the year round.

Shorea Assamica.—Assamese name, Makahi ; English, none ; specific gravity, 0·82 ; co efficient of rupture in cwt. and decimals, 13·2 ; loss of weight in chemical drying, 36 per cent ; maximum shrinkage due to the above process, 5 per cent.

This tree deserves, for many reasons, more attention than any other. It is, for one thing, quite a new tree, so to speak. It was but a few years ago that Mr. G. Mann, the Conservator of Forests in Assam, took special notice of it, and studied and classified it with the devotion and care peculiar to all true naturalists.

To the best of my knowledge, it grows exclusively along the hills on the south bank of the Dehing river, forming a belt which thins out and eventually disappears as it approaches the Patkoi range to the south, and the Jaipur (Assam) district to the west. How far it extends eastward I cannot say. Not one Makahi tree is to be found north of the Dehing river. It grows to various heights, and always in well-drained ground. Its gregarious tendency forms an exception to all other Assam trees : in some places, the forest is almost exclusively constituted by Makahi trees and in all cases it grows so thick that were all the other trees, to disappear, there would still remain a good Makahi forest. Its stem grows perfectly straight to a height averaging 70 feet to the first branch, and a girth of 8 feet. It is not unfrequent to find some of 90 feet or even 100 feet to the first branch, and 12 to 14 feet girth. In the construction of some bridges I required fifty trees that should not measure less than 8 feet girth at 60 feet above the ground, and I found them all within a radius of a mile from Margherita. The timber is almost white when newly cut, but soon turns to a dark yellow colour and brown if exposed to the open air. Its grain is very straight and not very close, and warps and splits when quickly dried but not otherwise. It soon rots away in the ground or when subject to constant and abundant moisture, but stands very well under cover or in the open air as long as water cannot lodge in contact with it. White-ants and borers will attack it.

Notwithstanding the lasting qualities of this timber not being very superior, we consider that at no distant date Makahi is destined to represent an important item in the timber trade of India. We may incidentally mention that its liability to rot and to be eaten by insects can be disposed of by pickling, and that this pickling has proved to be very effective when done with crude petroleum, of which there are abundant springs belonging to the Assam railways, right in the centre of these forests. But independently of that a cheap timber for general purposes, to be used as common deal is used in England, has been entirely wanted up to the present in Assam and Bengal. Bamboo is often substituted, but as often as not this does not answer, and then the expensive teak or sal is used. Makahi does not present the same difficulty as other Assam timber in felling and collecting ; it is easily worked, leaves little waste on the ground, and there is such a quantity as will supply the market for many years to come. Up to the present it has been practically unknown and inaccessible. This latter difficulty has been done away with by the opening of the railway from Dibrugurh to the Makum coal-fields. The former will disppear as fast as the advantages of this timber are recognised.

We will finally remark that, besides the trees above mentioned, there are at least a dozen more species equally good, though not so abundant. The great drawback of their growing so mixed is, in the case of the Assam railways, removed to a great extent by the peculiar feature of its timber concession, owing to which the farthest tree has never to be dragged by elephants more than 1½ miles to reach the railway.—*Timber Trades Journal.*

LIGHT MANURES.

By Dr. A. P. Aitken,

Chemist to the Highland and Agricultural Society.

When a farmer has discovered by experiment what are the wants of his soil as regards the three chief ingredients of manure—nitrogen, phosphoric acid, and potash—for the growing of certain crops, the chief difficulty in the selection of light manures is overcome. He has next to consider in what form he ought to apply the required substances, and that is by no means an easy matter, for the assiduity and enterprise of manure manufacturers have provided for him a very great variety of materials whose very names are perplexing, and whose compositions and characteristics are frequently but little understood. Every year sees the advent of some new kinds of manure, and the market is constantly changing. Old manures are being presented under new names, and sometimes new manures under old ones, so that much care and discrimination are needed in choosing the *form* of manure which sha'l contain the ingredients suited to the needs of the buyer. In the subjoined table are given the percentage of the valuable constituents of the chief kinds of manures :—

COMPOSITION OF LIGHT MANURES.

	Soluble Phosphate.	Insoluble Phosphate.	Ammonia.	Potash.
	per cent	per cent	per cent	per cent
PHOSPHATIC MANURES—				
Mejillones Guano	...	72	...	...
Maldon Guano	...	74	...	...
Mona Island Guano	...	50	...	...
Estremadura Guano	...	40—80	...	...
Canadian Apatite	...	82	...	...
Caraçoa Phosphate	...	75	...	...
Aruba do.	...	80	...	...
Ardennes and Belgian Phosphates	...	63	...	...
Carolina and Charleston Phosphates	...	50—60	...	...
Coprolites	...	40—60	...	...
Bone Ash	...	75	...	...
Bone Char	...	60	...	...
Superphosphate	15—40	...	...	...
NITROGENOUS MANURES—				
Sulphate of Ammonia	...	...	25	...
Nitrate of Soda	...	...	19	...
Dried Blood	...	...	15	...
Horn Dust	...	...	13	...
Shoddy	...	...	5—10	...
Leather	...	...	5—9	...
POTASH MANURES—				
Muriate	...	...	..	50
Sulphate	...	...	...	27
Kainit	...	...	...	12
CHIEFLY PHOSPHATIC—				
Bones, Bone Meal, &c.	...	50	4½	...
Steamed Bone Flour	...	60	1½	...
Vitriolated Bones (av.)	12	20	3½	...
Genuine Dissolved Bones	20	12	2½	...
Peruvian Guano (genuine)	77	40	5	...
CHIEFLY NITROGENOUS—				
Ichaboe Guano	10	10	13	1
Peruvian Guano (old residues)	10	20	10	3
Fish Guano	...	30	10	...
Frey Bentos Guano	...	16—30	12—6	...
Flesh Meal	...	0	12	...
Rape and Cotton Cake Dust	...	1½	5	1½

Regarding phosphatic manures, it may be said that their use in the undissolved state has only recently attained what might be called important dimensions. The vast bulk of these substances goes to supply the raw material for the manufacture of superphosphate, so that the composition and character of the various phosphates enumerated are of interest rather to manufacturers than to farmers. Experiments which have been carried out in Scotland during recent years—in Aberdeenshire and also at the Highland and Agricultural Society's stations—show that undissolved phosphates, if only ground fine enough, are quite serviceable as manure, and though they cannot be said to have been found to be either so successful or so universally applicable a form of phosphatic manure as superphosphate, yet there is no doubt that on certain soils and in certain circumstances they are to be preferred to that manure. The soils which, in my experience, have given the best results with ground phosphates, are moory soils rich in organic matter. On such soils, ground phosphate, when applied for the turnip crop, have usually done better than superphosphate, but instances are not wanting in which they have shown their superiority also on clay land. They are a slow acting manure, and are therefore applicable only to crops like the turnip, which have a long period of growth. The experiments carried out by Mr. Jamieson in Aberdeenshire—on a small scale certainly, but yet very carefully done—showed that, upon the whole, ground phosphates were to be preferred to superphosphate, and although the results of experiments in other parts of the country do not quite corroborate the Aberdeenshire experiments, there is enough of evidence to show that ground phosphate may be a very good manure, and more economical in some cases than superphosphate. The experiments made to determine the relative value of these two forms of manure have usually been conducted on the basis of making the amount of phosphates equal in each case, so that the crop manured with superphosphate received its sulphuric acid in addition, and had, therefore, more money expended on it. Had the experiments been on the basis of equal money value, it is probable that the money spent in dissolving the phosphate might in many cases have been more economically applied in increasing its amount. That is a question which each farmer must decide for himself. There are two facts that are clearly brought out by the Scottish experiments. First, that there are only some kinds of phosphate that are of any use when applied in the undissolved state ; and second, that even the best of them fail unless they are ground down to the state of very fine flour—what is called an impalpable powder—so fine that no roughness or grittiness can be felt when rubbed between the finger and thumb. It must be confessed that it is not easy to determine whether a sample of phosphate is all of one kind, and that a favourable one ; and the sense of touch is not one on which a farmer can rely, for the delicacy of that sense varies greatly among individuals, and even with the same individual according to the use he has been recently making of his hands. In order to prevent disappointment or loss in the use of ground phosphate, a guarantee of purity would be necessary, and a standard of fineness adopted, such as that proposed by the Chemical Committee of the Highland Society two years ago, which was a sieve of wire cloth, having 80 wires in the linear inch. So far as my experience goes, the best mineral phosphate for applying in the finely-ground state is Charleston phosphate, and the worst is Canadian apatite ; but if the use of ground phosphate is to become more general, it would be desirable to have a set of experiments made with the various mineral phosphates, of equal fineness, to determine their relative suitability for immediate application.

It is one of the advantages of superphosphate that it is a matter of indifference what is the kind of phosphate that has been used in making it, so long as it has been thoroughly dissolved. All that is required is that it be in a fine dry state, and not in the least lumpy—as superphosphates very frequently are—for even little lumps the size of a pea are a disadvantage in a superphosphate, and greatly impair its usefulness. When superphosphates are too new, or when they contain more than about 28 per cent of soluble phosphate, they are liable to contain many little lumps, and that is why the medium superphosphate in the Highland Society's stations has produced the best results.

When a superphosphate is put on the land, its soluble phosphate becomes insoluble very soon, almost immediately, if the land is rich in lime—and in so far as solubility is concerned, the phosphate so produced may possess no advantage over the insoluble mineral phosphate, but there is one great advantage gained, and that is, the exceedingly fine state of division in which the phosphate is precipitated in the soil. The more finely a phosphate is divided, the greater is the extent of its surface which is exposed to the solvent action of the roots of the crop, and it is to the enormously increased surface so exposed that the rapid effect of superphosphate is to be attributed. If the land is rich in lime the soluble phosphate will be precipitated as phosphate of lime, but if it is poor in lime, the soluble phosphate will enter into combination with oxide of iron and alumina in great measure, and form insoluble phosphates with these substances.

The kind of precipitate formed in different soils will, therefore, vary very much according to the relative abundance of these basic substances, and experience shows that in some soils the precipitate formed is of a much more insoluble kind than in others. We are, therefore, led to the conclusion, that when land is poor in lime, there is an opportunity given to the superphosphate to be converted into a more insoluble phosphate than the original mineral from which it was manufactured, and in such a case it is easy to see that it would have been better if the finely ground original mineral phosphate had been applied in the undissolved state. Another inference to be drawn from this fact is, that the application of lime to a soil which is poor in it will have the effect of preventing this very insoluble iron and alumina compound from forming, and will cause the superphosphate to be converted into the insoluble phosphate of lime, which, though it is insoluble in water, is nevertheless easily soluble in acid, and what is more important, it is easily dissolved by the solvent action of the roots of plants. I have no doubt it is within the experience of many farmers that superphosphate did better on land after it had been limed than it did before the liming, and I think it highly probable that in those cases where it is found that mineral phosphate is more efficacious than superphosphate, the tables will be turned if a light liming is given to the land.

As a rule, phosphate applied in the soluble form has marked advantages over insoluble phosphate. It is far more reliable ; it makes a more uniform crop ; it acts very quickly, and may therefore be applied with advantage to short-lived crops ; it usually makes a more abundant crop, and at Pumpherston station it has always made an earlier crop. But this is not a subject on which to dogmatise, for soils vary infinitely, and therefore my advice to farmers is—prove it for yourselves.—*North British Agriculturist.*

Registered No. 182.]

THE INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, MAY 30, 1885. [No. 22.

Crop and Weather Report.

[FOR THE WEEK ENDING MAY 20, 1885]

GENERAL REMARKS.—Rain has again fallen throughout the Madras Presidency, but, except in the Ganjam and Kistna districts, the falls were too light to be of much benefit to the crops, which still want rain in some districts. No rain has fallen in Mysore, where prospects remain unaltered. Want of pasturage for cattle continues to be felt. In Bombay slight rain fell in 13 districts ; rain has fallen also in the Punjab generally, and in parts of the North-Western Provinces and Oudh and the Central Provinces. In Bengal proper and Assam good rain has fallen generally. Rain was also general throughout the Central India and Rajputana States, and prospects continue good.

Agricultural prospects remain unaltered in Madras. The *rabi* harvest has been completed in the Central Provinces, and is approaching completion in Bombay, the Nizam's Territories, the North-Western Provinces and Oudh, and the Punjab. *Kharif* operations are in general progress throughout these Provinces and the Berars. The recent rain has much improved the prospects of the standing crops in Bengal, and has facilitated agricultural operations. Early paddy and jute are being sown in many districts, and harvesting of *boro* paddy continues. Ploughing and sowing continue in Assam ; and tea is reported to be doing well in Cachar.

Cholera, small-pox, and fever are reported to a greater or less exten from most Provinces.

Prices are fluctuating in the Punjab elsewhere they are generally steady.

Madras.—General prospects fair, except in parts of Bellary and Anantapur.

Bombay.—Slight rain in parts of 13 districts. *Rabi* harvest completed in all districts, except Shikarpur ; preparation for *kharif* crops in progress in 9 districts ; scarcity of fodder and drinking water continue in several parts of Dharwar and Belgaum. Cholera and small-pox in parts of 13, fever in parts of 12, and cattle-disease in parts of 6 districts.

Bengal.—Rain fell almost everywhere during the first part of the week and has facilitated agricultural operations and improved prospects of standing crops ; early paddy and jute are being sown in many districts ; harvesting of *boro* paddy still continues ; mango is a poor crop. Prices of food-grains generally steady. Cholera and small-pox prevalent in many districts.

N.-W. Provinces and Oudh.—Rain has fallen in most districts. Harvesting operations very nearly completed, outturn good. Markets well supplied and prices steady. Cases of cholera reported from a few districts.

Punjab.—Rain in nearly every district. Cholera in the Umballa and Mooltan districts abating ; virulent fever in a few villages of the Peshawar district ; health otherwise generally good. *Rabi* being harvested, outturn in the Umballa, Sialkot, Lahore, and Shahpur districts partly damaged by rain ; *kharif* operations in progress. Prices fluctuating.

Central Provinces.—Weather hot, with occasional storms. *Kharif* preparations progressing. Cholera continues in Hoshungabad, Nimar, and Raipur. Prices steady.

British Burmah.—Cholera, which has abated in Pegu, is slightly prevalent in Akyab, Kyoukphyoo, Thongwa, and Amherst ; some cases of small-pox in Kyoukphyoo, and Tharrawaddy ; otherwise public health generally good. Cattle-disease prevalent in 3 districts. Rain has fallen in most districts. Weather cooler.

Assam.—Weather hot. Sowing of *aus* almost over ; prospects good ; ploughing operations for *sali* crops in progress. A few sporadic cases of cholera reported.

Mysore and Coorg.—Crops in good condition. Prices generally stationary. Prospects of season and public health good.

Berar and Hyderabad.—*Rabi* crops continue to be reaped. General health fair, except in Shahabad and Merchal taluks, where cholera prevails. Prices—wheat 15, coarse rice 12½, white *juari* 23½, yellow *juari* 23½, and *tur* 17 *seers* per current sicca rupee.

Central India States.—Weather hot. Health good. Prices steady.

Rajputana.—Weather cloudy and seasonable, but cool for the time of the year ; high winds prevail. Health good.

Nepal.—Weather stormy and cool. Prospects moderate. Health in the valley of Katmandu good.

Letters to the Editor.

SEEDLINGS FROM FRUITS.

TO THE EDITOR.

SIR,—I hope you will allow me a little space for the following remarks ;—It is a general belief among the cultivators and gardeners of this and other places that mangoes grown from such seeds, the fruits of which have been eaten, invariably produce inferior and sour fruits. The same is said to be the case with pomegranate and other fruit trees. The reason assigned by the natives is that the seed is affected by the saliva of the mouth and is poisoned by it. The science of botany informs us that the seed coat bursts open on germination of the seed ; and the young plant derives its nourishment from the true seed and not from the coating. Be that as it may, the natives have a strong belief in the saliva-poisoning theoryt I am, therefore, unable to find the true scientific explanation for this. Would you, therefore, or any of your readers, favor me, through your columns or otherwise, with a true and reliable explanation of the above mentioned belief?

R. D. JANEE,
Agricultural Department, Bhavnagar State.

Bhavnagar, 16th May 1885.

NOTE.—We cannot explain the "saliva" theory, but we would refer our correspondent to the *Indian Agriculturist* of the 2nd instant for an explanation of the deterioration of fruit plants raised from seed.—ED., *I. A.*

DESTRUCTION OF WEEDS, &c.

TO THE EDITOR.

SIR,—Will you, or your correspondent, Baboo Hem Chunder Dutt, kindly enlighten me and a number of agriculturists with the method of destroying rank grass, weeds, &c., and of fertilizing soil so that it may become sharp, porous and friable ; and thereby oblige—

ANOTHER FLORIST.

Calcutta, 19th May 1885.

DFSTRUCTION OF RANK GRASS, WEEDS, &c.

TO THE EDITOR.

SIR,—With reference to the query of your correspondent "Another Florist," I beg to suggest to him the following method, for the destruction of rank grass, weeds, &c., which will also make the soil sharp, porous and friable :—

Spread thinly a layer of gas lime over the ground, as a "top dressing." If gas lime fresh from the purifiers be applied to soil, the salts which it contains will destroy vegetation. It is, therefore, necessary to expose it to the atmosphere in order to transform the injurious sulphur compounds into fertilizing agents. The sulphur and ammonia which render fresh gas lime fertilizing agents, and become destructive to vegetation, are the ingredients so valuable in decomposing compost heaps ; it therefore follows that the fresher the gas lime can be applied to compost heaps, the sooner the results required will be obtained, as the salts which *go off* with exposure to the air, have a powerful effect in decomposing the vegetable substances in compost heaps.

Such composts when applied as manure, after three or four months, contain sufficient salts and tarry essences to make the substance uncongenial to insect life, so that by the application of such manures, a double object is obtained—*1st*, the fertilization of the soil, thereby rendering it more sharp, porous, and friable, and *2nd*, the destruction of insect life.

It must be remembered that the apparent crystallization of gas lime is due to its exposure to the atmosphere.

HEM CHUNDRA DUTTA.

Rughoo Nath Chatterjee's-street,
Malakar's Cottage, the 21st May, 1885.

CEARA RUBBER (MANIHOT GLAZIORI) IN THE KULSI PLANTATION, KAMRUP, ASSAM.

TO THE EDITOR.

SIR,—A small quantity of Ceara Rubber seed was received in June 1879, and sown on the 25th of that month on a seed bed situated on the spur of a hill facing the east. The soil of this spur is very deep, being composed of a brown or reddish loam mixed with a portion of clay. The consistency of the soil is neither very stiff nor very loose, but moderate. In appearance it is somewhat like the laterite soil of *Eng* forest in Burmah, or of the ferruginous soil of the Sivalik hills. The hill from which the above spur projects is situated on the right bank of the Kulsi river, which, issuing from the Khassia hills, joins the Brahmaputra at an equal distance between Gauhati and Goalpara. Teak plantations of some 8 or 9 years' standing cover the hill alluded to above. On the extreme end of this spur, which terminates rather abruptly in the Kulsi river, is erected a beautiful bungalow for the accommodation of the Forest officer. This bungalow faces the south, and commands an extensive view, covering some miles, of the Kulsi valley. The site selected for the nursery of the Ceara Rubber is protected on the two sides, north and west, by the range of hills which run almost parallel to the Kulsi river. Thus the violent north-westerly winds, which blow with much force for many months of the year, have less effect on the nursery bed than would have been the case had it been situated on some other open place. The climate of this place may be said to be semi-tropical. The rain commences from the middle or end of April, and lasts till the beginning of November. The average rain fall is 78 inches and the average temperature is about 70 Fahr.

The seed was sent for an experiment to ascertain whether this plant, whose native home is at Ceara in Brazil, would grow as well in Assam, the climate of which place is said to resemble that of the Ceara district. As stated elsewhere, the seed was sown on the 25th of June, but nothing came out till the end of September, when only two or three seeds germinated. The seed is very hard, harder than a plumstone. It is about the size of a small bean. Its vitality is wonderful. The seed sown in June 1879 was taken out from the nursery bed in March 1881 without being injured or decayed; and one of them left in the bed germinated in July 1882, after being for over three years in the ground. Some of the seeds thus taken were filed in order to hasten their germination, if possible, while the rest were soaked in a weak solution of sulphuric acid and water for a day. They were sown again after undergoing the above processes separately in two beds. Of those which were filed only two germinated within a fortnight, but none of those steeped in sulphuric acid and water. This simple fact decided Mr. Mein, the divisional Forest officer, to adopt the method of filing the Ceara Rubber seed before sowing it, and it has acted admirably well in respect of easy germination. Before experience was gained on the subject, the seeds were filed sometimes on the top, at right angles to its longitudial axis, thus increasing the aperture of the hilum or microphyle, and sometimes on the two sides of the hilum securing the hard testa so that it may easily burst at the time of germination. The second system was very successful while the first system failed altogether. Thus by the second system all the seeds germinated within from 14 to 44 days.

The young seedling with the two cotyledonary leaves looks like the castor-oil plant, but soon after, when more leaves come out, its appearance changes and the plant is sometimes mistaken for a Papua seedling, for its juice resembles that of the Papua plant When the seedlings are 9 inches or 1 foot in height they are transplanted in suitable localities, and are well fenced, lest the deer should take a fancy to them. As regards locality, perfect drainage of the soil and subsoil is essentially necessary for the cultivation of this plant. It also prefers open high ground and hill-sides to shady or low-lying grounds. The growth of this plant is wonderfully rapid. The two seedlings which came up in September 1879 were found, when measured on the 16th June 1880, to be 6ft. and 3ft. in height respectively, and in May of the following year 21ft. 9in. and 14ft., so that one of them has grown over 1ft. per month. Another plant on measurement after six months from date of germination was found to be 19ft. in height. It is a very soft-wooded tree, and requires strong wooden posts for support. The tree will probably coppice well. One small plant was broken to the ground by a violent storm, and the stool, after a few days, had been noticed to throw out fine and vigorous shoots. It can be easily propagated by cuttings, since some of the branches were cut and planted out with a view to propagate it, and they were seen to sprout. In the Kulsi plantation, there are now probably 150 plants from 4 to 40ft. in height. Their girths vary from 2' to 20'. Here the trees begin to lose their leaves in January, and remain leafless for more than a month. At that time they very much resemble in appearance a birch tree, and the surface of the bark comes off in the same way in their peelings. The seed-bearing trees are the last to put forth leaves, and this they do when all the seeds have fallen to the ground. The two biggest trees seeded profusely during the past two years. They commence to flower in the beginning of December and the seed ripens by the begining of March. The bunches of ripe fruit remain on the tree while it is leafless. The pod when ripe bursts, and goes to pieces, so that the seeds are scattered on the ground at some distance from the parent tree.

JOGESWAR SEN.

Dhubri, 25th May 1885.

Editorial Notes.

WE print elsewhere an article entitled *The Ensilage of the Future*, extracted from a home contemporary. It is a review of Mr. G. Fry's book bearing that name. We have read this article with much interest, and reproduce it *in extenso*.

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WE find that the net amount of Indian sea [illegible] land customs revenue, exclusive of salt revenue, for the first [illegible] of the current financial year, was Rs. 12,77,000, as [illegible] red with Rs. 12,42,000, during the corresponding month of the last year.

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THOSE interested in the subject of the supply of Indian grass and other fibres for paper-making, will be glad to learn that there is a practically unlimited quantity of the *babui* grass to be obtained along the Nepal frontier, within our territory, and that considerable quantities are already being sent by the Tirhoot State Railway to Calcutta.

***

WE cannot say how far it is true, but it is reported that the whole of the mining rights in the Nizam's Dominions have been leased to an English company, supposed to be Messrs. Watson, Stewart, and Co. This may be a move in the right direction; but as we have received no particulars, we are not in a position to express an opinion on the subject.

***

THE Indian Association sent the following telegram, we understand, to the Lieutenant-Governor at Darjeeling the other day:—

> A great scarcity of water prevails at Nulhatti, Nowada, and other parts of Beerbhoom. The re-excavation and digging of tanks are essential, and require prompt attention, and *taccavi* advances are necessary for the purpose.

The Association is quite right in keeping the attention of the Government constantly drawn to the subject.

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WE are glad to learn that the Madras Government have hit upon another, and more practical, means of finding employment for poor Europeans or Eurasians. The intention is that three European or Eurasian pupils are to be attached to each of the four Native Cavalry Regiments in Madras, with the object of being trained as veterinarians. After they have acquired a sufficient knowledge of the subject, and have qualified as farriers, they will either be drafted into that branch of the military service, or the Government may permit them to be employed as veterinary practitioners in the district, or in connection with public or private companies. The suggestion for this experiment, we hear, emanated from Sir Frederick Roberts, and we hope that the required number of young men of the proper stamp will be forthcoming for this service. The experiment ought, we think, to prove successful, and may, with advantage, be tried in the other presidencies.

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THE table attached to the report of the Board of Revenue on the Road and Public Works Cess operations for the year 1883, shows the number of estates and tenures assessed, and the number of recorded shareholders for each district. The figures include only estates and tenures assessed with road cess, and it follows, therefore, that all revenue-free estates situated within the boundaries of municipalities, all revenue-free estates of which the value is less than five rupees, and all tenures of less than a hundred rupees annual value, are excluded from the statement. Such as it is, however, the table shows that the total number of estates in the province is 2,62,254 and the number of recorded proprietors, 12,11,519, giving on an average 4·6 shareholders to every estate. The figures also show a total number of 11,81,218 tenures, or an average throughout the whole of Bengal of 4·5 tenures to each estate.

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SERICULTURE in India has made very rapid progress in recent years; but however much we may know of the habits and food of the silk-worm, any information that will add to our knowledge of the subject must be received with satisfaction by all interested in the industry. We thus learn that Mr. Hosie, who travelled through the Province of Szchuen in June and July last year, discovered a new tree, which is extensively cultivated in the western parts of the province as a source of food for silkworms. He describes it as follows :—It stands from 10 to [illegible] in height, and resembles an overgrown tea tree. The leaves, which spring alternate from the branches, are of rich dark green colour, smooth, ovate, acuminate, and not serrated. It is very extensively grown, and its leaves are used to feed the silkworms in their infancy. The local name is the *tea* (*cho* in the north.) *Yeh* tree. It is apparently a species of thorn. The peasantry insist, that unless the young silkworms are fed with the chopped leaves of this tree, the output of silk will be less and of an inferrior quality.

If the properties ascribed to it are to be accepted as correct, the Government of Iddia in the Agricultural Department would do well to take some measures to procure specimens of the tree for experiment in India.

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We have have before us the results of the experiments made last year at the Cawnpore Model Farm in the preparation of ensilage. The experiments were tried on an extensive scale, there being ten earthen pits and three masonry pits filled. The crops made use of were juar, sorghum, guinea grass, and common grass, the first three being grown on the farm, and the latter purchased from grass-cutters at the rate of one anna per 82lbs. The grasses were cut just as they were coming into flower : the sorghum and part of the juar were cut when the cobs were fully formed, and ripe enough to allow of their being cut and stored ; the stalks were quite green, although they had lost a good deal of their moisture. The juar, sorghum, and a portion of the guinea-grass were cut into chaff before packing, whilst the common grass was put in as it was brought from the fields. The earthen pits were nearly all circular in form, a little broader at the top than at the bottom, so as to give a slight slope to the walls. Seven of the earthen pits were covered with *chuppers* to protect them against the rain, and over three others a sloping mound of earth, three feet high, was made. In the case of the larger pits, an opening was cut at one of the sides to allow of the entrance of a bullock to tread down the stuff. The silos were filled in layers, each layer after it had been trodden down being sprinkled over with a little salt, and covered over with *bhusa* to the depth of about two inches. The intermediate layers were weighted with pieces of bricks, and the final layer, after being pressed down, was covered with earth to the depth of two or three feet. The cost of making and filling the silos was trifling compared with the outturn. Thus, for example, a circular silo, ten feet in diameter, and only six feet in depth, cost altogether for ensilaging 171 maunds of juar, Rs. 9-15-6, divided as follows :—Cost of digging, Rs. 0-12-0 ; of *chupper* for covering, Rs. 2-8-0 ; of cutting into chaff, Rs. 5-3-6; of filling, treading down, and weighting, Rs. 1-8. Another experiment in ensilaging 725 maunds of common grass in an elliptical silo, 18 feet in diameter and 10 feet in depth, cost Rs. 34-14-9, and, considering the amount of stuff that is produced by it, it appears to be the cheapest method of obtaining fodder.

It would, however, have been interesting to know the quality of the ensilage produced ; but as nothing is said upon this point in the Report of the Farm for 1884, we are not in a position to offer any remarks on the subject. We observe that a change has been made in the designation of this Farm. It is now called the "Cawnpore Agricultural Station."

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We called attention the other day in the pages of the *Statesman* to the terrible distress that exists in the Moorshedabad district, and we have now before us a letter from Nulhati in which the writer says :—

> I beg humbly to call your attention to the great distress that is prevailing in the Beerbhoom district. The scarcity is gradually assuming a fearful shape, and relief measures should be at once organized on a more extensive scale. Cholera is moreover decimating the population, and the want of water is being severely felt, while hunger is compelling the poor to take the most unnatural kinds of food ; others wander away from their homes, leaving their helpless wives and children to their destiny. Though several relief centres are supporting nearly 6,000 persons, a very large number remain to be relieved. For the able-bodied, relief works should be opened by the Government, or their future will be most gloomy The ryots are so impoverished that if the Government does not grant them small loans on favorable terms, there is no hope of the land being tilled at all this year. Let me beg you to bring your influence to bear upon the matter.

Is it not most melancholy that we can sanction an expenditure of crores of rupees, in futile preparations for war in almost any direction, and upon almost any pretext, for the destruction of human life, while the doors of the Treasury are closed without remorse, upon people dying of hunger within fifty miles of us ? It is the literal fact, that we hesitate far less over an outlay of a crore of rupees upon military fire-works, than over a grant of Rs. 10,000 to save our starving poor from the last extremity of famine. The Government finds not the slightest difficulty in providing ten, fifteen, or twenty crores of rupees at any moment for war, but cannot find ten, fifteen, or twenty thousand to save our own villagers alive. We boast of our civilization and enlightenment, while our conduct is that of simple barbarians. An expenditure of a few lakhs of rupees would save all the suffering the people are enduring, and the custodians of the public purse assure you that they positively cannot afford it. How is it that the money is always there for war ?

Since the above lines were in type, we have received the following telegram from Sainthia :

> The scarcity of water is seriously felt at Nowada, Nulhati, and elsewhere. Cholera moreover is raging at Nulhati, and no time should be lost in helping the people with advances (*tuccavi*) to dig, or excavate tanks. Delay will cause great suffering.

We have no desire to reproach the local Government, but we are strongly persuaded that its action is not adequate to the need of the people.

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The Commissioner of the Presidency division sends us the following telegram, received by him from the Collector of Moorshedabad, in reply to the statement of the special correspondent of the *Bangabasee*, reproduced in a recent issue of the *Statesman*, that 31 deaths from starvation had occurred in thanna Khurgram, of that district :—

> No deaths from starvation at Khurgram, nor immediate likelihood of any. Rest of thanna better off.

The Government must not be surprised if we receive the usual official assurances as to the condition of the people, with distrust. It seems ungracious to do so, but we have so painful a memory of what such assurances have been worth in the past, that we find it impossible to accept them without reserve. We cannot contradict the above telegram, but the special correspondent, who forwarded it to us, should at once say upon what testimony his statement was made. For the rest, we do not think it hypercritical to remark upon the strange expression in the telegram, that there is no '*immediate* likelihood' of any of the people dying of starvation. The words certainly seem to indicate that the distress is extreme, and when we hear of distress of this order being *relieved* by a dole of 'two pice' a day to the people who are starving, we are not satisfied, nor should the public we think be so. To this hour, in no part of India does the Government ever assume the right attitude, when calamity of this kind comes upon the people. We are not speaking lightly when we say so. Where the people are without work, and food is at very high if not quite famine prices, it is an absolute mockery of their condition to make a dole of half-an-anna a day to each as relief. It means starving them to death slowly, and is an attempt to make a compromise with claims that admit of none. As there is no poor law in the country, but a professed provision for famine, the Government is bound to adopt adequate measures of relief for the people, and we feel bound to say it does nothing of the kind. It gives the scantiest possible assistance, where it is bound to give full and adequate relief, and boldly and systematically devolves upon private charity, a responsibility that such charity is quite unable to discharge. At all these periods, the Government makes it a rule of leaving the assistance of the destitute high caste and zenana classes, to the efforts of private philanthropy. All that it has a right to expect from that philanthropy, is done, when private associations have been formed for ministering to the misery of the classes who retire into their houses to die, because they cannot go like coolies to the relief works or soup kitchens. We ask Sir Rivers Thompson himself what prevents his placing means at the disposal of the private organizations that have existed for months past, for the relief of distress that retires from the public gaze. He has ample guarantee in the character of these associations, for trusting them and *should* trust them, and give them all the encouragement in his power, to discharge their humane but painful and self-imposed duties, with success. It is not the Government of Bengal only, that fails to grasp the right idea as to how these calamaties require to be met. There is not a Government or Administration in the country, that shows a just understanding of its responsibilities in these crises, and the proof of it is the instinctive way in which they all look to the public, to share a responsibility that is entirely their own. At this moment, there are, we believe, two or three private societies formed for the relief of classes who will die, if they are not sought out and relieved in the privacy of their homes; and what could be more legitimate than for the Government, after making proper enquiries, to constitute these private societies its almoners? Can we really do nothing for the people, except through the workhouse, or the contractor with his spade and shovel? We believe far more might be done also, by *tuccavi* advances at these seasons. It should be sufficient for the district officer to report, that there was actual suffering amongst the people, for the purse-strings to be freely loosened. What if ten, twenty, or thirty thousand rupees *are* spent without much return? Will it ruin us? What is really necessary is to get rid, once for all, of the 'grinding' idea that pervades all our relief steps.

⁂

The subject of the assessment upon trees has been engaging the attention of the Madras Government. Mr. Pennington, the acting Collector of Tanjore, submitted to the Board of Revenue a set of rules which he thought would meet the case, and which the Board proposed to apply. The Government, however, in passing orders, observed that the rule which Mr. Penningten and the Board proposed to apply in the Tanjore district was entirely opposed to the custom of the district, which was recognized and ordered to be maintained in previous orders. The papers under consideration showed that the property of the mirasidars in taxed fruit trees growing on assessed land, in backyards, in village-sites, on the margins of fields, [called ryot's or individual (Asami) poramboke in Tanjore] and in avenues planted by them was fully recognized The same was the case in regard to trees planted by mirasidars on channels and river banks. As regards isolated fruit trees on other porambokes and on unassessed land, the principle that the property of the original planters, or their heirs, if known, should be recognized, ought to be followed, though there were no express orders onthe point. The presumption in Tanjore was decidedly in favour of the mirasidars' rights to fruit trees, but as regards untaxed trees in waste, their rights were not different from those of village communities elsewhere.

Further, that the orders regarding Tanjore were based on exceptional rules for the encouragement of tree-planting, which always prevailed there and produced beneficial results: and the Government were decidedly of opinion that no change in the existing practice of the district should now be made. To apply the special Tinnevelly rule in Tanjore, or to assert generally the rule that holders of puttas for scattered trees in that district were only entitled to the usufruct, would be entirely wrong.

With regard to the Mannargudi case, the Government observed that the Collector's order did not, as stated by the Board, assign the assessment to the Municipality, but merely waived the Government claim to the small assessment involved, so far as it stood in the way of a desirable public improvement. If the trees, as was probable, belonged to the mirasidars, their rights were no doubt unaffected by the transfer of the trees to the Municipal Commissioners, and they would be entitled to the sale proceeds. But the Government apprehended that the proprietary right of Government in the trees, so far as it arose from the fact of the land being public poramboke, passed to the commissioners under the Act; and unless there were grounds for admitting a private right, the commissioners were entitled to the trees. In any case the proceeds could not, and need not, be claimed for Government.

⁂

The Madras Government have recently had under consideration the question of modifying the [illegible] in regard to the exercise of the permission to hunt, shoot, [illegible] Government forests generally, and with reference to an exte[illegible] of the Nilgiris in particular. In this connect[illegible] following rules, under section 4 (h) of the Madras Forest Act (Act V of 1882), for the Reserved Forests of the Nilgiri District, have been approved and issued by the Government of Madras:—

1. Any person who may desire to hunt, shoot, or fish within the limits of the Nilgiri reserved forests during the season in which such hunting, shooting or fishing is allowed under the Nilgiris Game and Fish Preservation Act (Madras Act II of 1879), and the orders of Government issued under it, shall be bound to take out a yearly pass at the office of the Collector of the Nilgiris.

2. The payment to be made for each such pass will be Rs. 15, and the said pass will not be transferable. It will be available only for the currency of the calendar year to which it relates, whether it be taken out at the commencement of, or during, the year.

3. The Collector may, from time to time, by notification in the District Gazette, declare that any particular reserved forest shall be closed against hunting, shooting, and fishing in any year or during any portion of a year, and after the publication of such notification, no pass taken out under Rule I, will be held to give authority to hunt, shoot, or fish in such closed reserved forests.

4. The poisoning of water or the setting of traps or snares for game in any reserved forest in the Nilgiri district is absolutely forbidden.

5. Any breach or infringement of these rules will render the offender liable to imprisonment for a term which may extend to six months, or to fine which may extend to Rs. 500, or to both, in addition to such compensation for damage done to the forest as the convicting Court may direct to be paid.

It is to be understood that, as hitherto, the fees will be credited, not to Forest Revenue, but to the Game Preservation Fund.

Mr. Gamble, Conservator of Forests, Northern Division, when recommending the adoption of the above rules, did not think that it would be possible to have one rule for both "reserved forests" and "reserved lands," although, undoubtedly, the different penalties prescribed by the Act in one and the other case constitute a difficulty. He was of opinion that the difficulty would disappear by degrees as "reserved lands" were converted into "reserved forests." The only localities in which, in his opinion, it was advisable to stop the shooting, were those sholas which, having been lately cut over, were now under reproduction, and the plantations, many of which were fenced and easily recognised.

⁂

A Great storm visited Rangoon on Sunday night, and so far as we have been able to learn the following are among the casualties:—The Port Trust police launch *Amherst*, which was at anchor near the Barr-street jetty and was getting up steam, was driven away by the force of the wind and had got well on to the Dallah side before the crew could get her in hand, and she was brought back with all her awnings blown away, and one anchor lost. The Port Trust dredger, which was working near the wreck of the French steamer *Oiolon*, sank, and those on board only managed to save themselves by jumping on to the sand-barge alongside. The Irrawaddy Flotilla Company's launch *Olio* broke from her moorings near the Barr-street jetty, and was driven westward till she got caught against the wire moorings of the S.S. *Oriental* alongside the Shoolay Pagoda wharf. In the Avagyee quarter of Dallah a barrack attached to a mill in which thirteen coolies slept, came down with a crash, killing one man and injuring all the rest, four of whom were so badly hurt that they had to be brought across to Rangoon for medical treatment. The Station Hospital, in course of construction in Cantonments, collapsed, and the zinc roofing from off several houses near the *maidan* was blown away on to the race course.

A cargo boat with 600 bags of rice belonging to Messrs. Strang, Steel and Co. lying alongside the ship *Scottish Dale*, was swamped; as was also another cargo-boat with 1,500 bags of rice alongside the S. S. *Lorne*. Three cargo-boats belonging to Messrs. R. J. Q Rowett lying alongside the S.S. *Madras*, with [illegible] bags of rice foundered, several of the crew being missing. Several godowns in Poozoondoung belonging to millers were unroofed—sheets of corrugated iron flying about like sheets of paper in the air, and carried to great distances. Many Burmese bazaar boats off the Municipal Bazaar sank, and a Burmese woman and child were picked up between a flat and the paddle of an Irrawaddy Flotilla steamer. The pontoon of the Bassein jetty was moved out of position; and the Moreton-street jetty was considerably damaged. Not a road but was marked with fallen trees and broken branches. Dalhousie Park looked yesterday as though it had just undergone a bombardment. Some people who were in a boat near the Salt Godowns are said to be missing, and also another man, who was upset in his canoe at Kemendine. Several country boats laden with paddy foundered in the Poozoondoung Creek, and it is feared that several lives have been lost there. These are, we fear, but few of the disasters caused by the storm, and we may expect shortly to hear of a good many more from the district as well as the suburbs of this city.

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The following resolutions were passed at a meeting of the agricultural election of the Eurasian and Anglo-Indian Association held the other evening in the Association Rooms, Madras, namely—(1) That the *Indian Agriculturist* or the *Tropical Agriculturist* be subscribed for; (2) that the Agri-Horticultural Society, Madras, be subscribed to; (3) that applications be made to Government or to the Sydapet Farm for an Aden bull for the use of the colonies near Bangalore; (4) that a rain-gauge or barometer and thermometer be procured for the use of the colonies; (5) that arrangements be made by members of the agricultural section to visit the colonies weekly; (6) that the Bangalore Committee be asked to favourably consider the entertainment of a practical man as Agricultural Superintendent on a salary of Rs. 40 per mensem; (7) that a copy of these resolutions be forwarded to the Bangalore Committee; (8) that the next meeting of the Agricultural section be held on the last Wednesday in June.

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Although the exports of wheat in 1884 were only two thirds of the amount which left India in the previous year, the demand from Italy, where the Indian grain is valued on account of its suitability for maccaroni, continued to increase—upwards of half a million cwts. having been taken from January to December. In 1882 the exports to Italy did not exceed one-third of this amount, and in 1883 were less by one fifth. Exports to Egypt also show a very marked increase during the last few years, and are at present four times as large as the exports to Italy. In 1883 three million of cwts. were transhipped in Egypt, whence a considerable portion is believed to be transhipped to other parts of the Mediterranean coast.

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The Director of Revenue Settlement and Agriculture, Madras, has, we hear, made a proposition that instead of, as at present, issuing the whole of the prizes in money to successful competitors at Agricultural Exhibitions, some might take the shape of presentations of stock and of suitable agricultural implements, the nature and kind of the stock being determined by consideration of the agricultural conditions of the districts for which the particular exhibitions are held. By the adoption of this suggestion, the Director is of opinion that stock would, by natural selection, as it were, get into the hands most likely to make the best use of it, and as the stock required for prizes would have to be bought in many places, an impetus would be given to private enterprise in the matter of stock-breeding, whilst at the same time the scheme would in time lead to the better breeds of one part of the country being introduced among inferior breeds in other parts, and thus lead to improvement in that respect. The scheme has the support of the Board, and has been submitted by them for the consideration of Government.

⁂

An inquiry was commenced some few days back at the Agricultural Department of the Privy Council which promises to have an important bearing on the future of agriculture in Great Britain. Lord Walsingham presided over a commission of agriculturists, who will take evidence as to the best means of preserving green crops by the ensilage process for the use of stock in the winter. It is beyond a doubt that the British farmer's best chance of competing with the foreigner is in the rearing of cattle, and some of the witnesses who have been examined state that they can keep more than double the stock by using ensilage, which has other advantages, such as making sure of securing a crop by harvesting it in all weathers and enabling an extra crop to be had. Some witnesses spoke of substances that were regarded as waste products of the land being greedily devoured by animals, Mr. Harris, M.P., mentioning that the rushes grown in the Devonshire valleys, and used for bedding, were actually eaten after acting as a covering for the ensilage and getting its flavour. The silos for preserving the green crops spoken to by the witnesses ranged from structures specially made to digging a hole in the ground and merely stacking it, sufficiently weighted to extract and exclude the air. Lord Walsingham's agent (Mr. Woods) spoke to ensilage being a valuable auxiliary to dairymen, as it could be sent by rail in casks, and it had actually become an article of commerce, and was sold at Maldon, in Essex, for 50s. a ton. The general scope of the evidence, so far as it has gone, is that the process only requires to be known to be generally adopted. Mr. Moffat, agent of the United States Department of Agriculture, referred to the reports to the American Government in the matter, and to a tour in France with Mr. Kains Jackson, the promoter of the ensilage competition at the Smithfield Club. The Commissioners will recommence their sitting shortly, and evidence will be taken at intervals during the Parliamentary session

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According to the *Civil and Military Gazette*, the following rules have been passed by the Maharaja of Cashmere for the regulation of shooting within his territories:—

1.—Killing game without a license is prohibited throughout the dominions of his Highness the Maharaja of Cashmere and Jummoo.

2.—Licenses can be obtained by Europeans from the officer on special duty and by natives from the Governor of Cashmere.

3.—Licenses are not transferable; require renewal annually; and do not give permission to any person employed by the holder to kill game.

4.—Killing game is forbidden in the province of *Jummoo proper*, in that part of Cashmere lying between the Sind and *Lidar* rivers, and in such places as are, or may hereafter be, reserved by his Highness throughout the country.

5.—The destruction of the females of the following animals is prohibited—Bara-Singha, Ibex, Markhor, Ovis Ammon, Shapoo, Burhal, Thibetan Antelope, Thibetan Gazelle. The destruction of Bara-Singha stags when hornless or in velvet is also prohibited. The destruction of Yak is altogether forbidden in the dominions of his Highness. Any necessary or accidental breach of any part of this rule should be reported at once to the officer on special duty.

6.—A close season, lasting from the 31st March (1st Baisak) to the 25th August (29th Sraban) inclusive, has been established for the following winged game:—Moonal, Argus, Cheer, Koklas, and Kalej Pheasants, Black and Chikor Partridges.

7.—Licenses may be revoked at any time in case of infringement of these rules.

State of Jummoo and Cashmere.

License to kill game.

To all whom it may concern. The bearer of this license.... ... . . is hereby authorised to kill game in the dominions of his Highness the Maharaja of Jummoo and Cashmere, until the end of the year eighteen hundred and eighty-five, subject to the conditions printed on the back.

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On the 9th ultimo, Mr. A. Cruickshank, Acting Collector of Anantapore, wrote to the Secretary to the Board of Revenue, forwarding villagewar statements for the taluks forming the Head Assistant Collector's division. He remarked:—"The Head Assistant Collector recommends the remission of the whole assessment on lands on which the crops have failed, or the out-turn was three annas or less, and of half the assessment on lands which yielded from four to eight annas. I see no necessity whatever to alter the scale already fixed by the Board and the Government in the case of the other taluks. The total remissions, calculated according to either scale, will come to much about the same amount. I am decidedly of opinion that the concessions which have been allowed in the Anantapore, Gooty, and Tadpatri taluks should be extended to the Head Assistant's taluks, for it will be seen from the statements now submitted, that the outturn in these taluks was in by far the greater number of cases not more than that estimated by Mr. Galton in his report of the 27th November last, after which there was no rain to do any good. The dews were scanty and the gram crops did not turn out so well as it was hoped they might do. A good deal of damage was also done to the crops by caterpillars." By the Board's proceedings, dated 11th March 1885, as modified by G. O. 25th March 1885, remission of assessment upon dry lands in the northern taluks of Anantapûre had been sanctioned according to the following scale :—For waste, full remission; for short crop—under 4 annas, full remission ; of 4 annas, 50 per cent remission ; more than 4 annas but less than 6 annas, 25 per cent remission ; of 6 annas and upwards, no remission. The Collector now recommended that this scale be applied to the four southern taluks of the district. His proposals have been sanctioned.

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THE report on the prospects of the wheat crop in the North-Western Provinces and Oudh for the month of April is as follows :—

The area under wheat, according to the April returns which are final, is 5,298,026 acres, showing an increase over March of 13,622 acres, an increase over normal area of 332,343 acres, and an increase over last year of 111,628 acres. Taking normal at 100, the area under wheat in the present year is 106 ; area under white wheat is 1,217,855 acres, area under red wheat is 2,013,496 acres, area under mixed white and red wheat 2,066,675 acres. The entire crop has been safely harvested, and with the exception of high westerly winds in parts of the Agra and Rohilkhund Divisions, which slightly shrivelled some of the grain, and save hail in a tract of the Bulandshahr district, the weather during April has been most favourable. Taking 100 to represent full average condition, the April returns, which are based on the appearance and weight of the crop harvested, show the condition of the crop after harvesting as follows—517,230 acres at 90 ; 4,145,873 acres at 84 ; 634,923 acres at 75. This shows an improvement on the whole compared with the prospects entertained in March. The gross outturn of a full average crop on the area now finally ascertained would be 2,500,000 tons. The present final harvest estimate of this year's crop is 2,100,000 tons or 60,000 tons in excess of the outturn estimated in March. Taking 100 to denote the gross outturn of a full average crop, this year's crop is 84. Of this total crop, 500,000 tons are white wheat, 780,000 tons are red wheat, and 82,000 tons are mixed white and red wheat. Adding the 60,000 tons surplus of the 1883-84 crop, the total stock of wheat in the provinces after the harvest in April was 2,160,000 tons, of which, after deducting food and seed for the coming year, it is estimated that 410,000 tons will be available for export.

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The report on the prospects of the wheat crop in the Punjab for the month of April is as follows :—

The area under wheat this year is very little in excess of that given in the Revenue Administration Report for the year 1883 84. But it may be assumed that the actual area is really larger. In former statements a large area under mixtures of wheat has been shown as under pure wheat. This year, where the grain of the mixtures is harvested separately, half the area under mixtures has been calculated as under pure wheat. While in those districts where the mixtures are not harvested separately, the area under such mixtures has been entirely excluded from the wheat returns. By the comparative statement accompanying, the difference in area is only—

		Acres.
1884	... ...	7,209,600
1885	... ...	7.381,400
Excess in 1885	...	1,71,800

Had the same method of calculation been applied to last year, it is probable that the area under wheat proper would not have been more than 6,000,000 acres. In addition to an increased area under wheat, most reports show that the outturn is generally good. Excessive rain and cloudy weather caused rust in the moister tracts, and the outturn in the unirrigated lands is this year probably higher than in irrigated. There is no reason for altering the report made in April that this year's crop is a full average one. Unfortunately, the recent heavy rains must have done some damage to the harvest. The crop has been almost everywhere cut, but very little has been threshed and gathered in ; the greater part is still lying out in the fields and is exposed to storms and rain. It is sincerely to be hoped that bright dry weather will now set in, and enable the harvesting to be completed.

Statement showing area under [illegible] in each district of the Punjab. In hundreds of [illegible]

	Name of District.	Area in 1884.	Area in 1885.	Difference.		Percentage.	Remarks.
				Plus.	Minus		
1	Delhi ..	1,415	1,082	..	333	23	* Area under wheat and barley mixed altogether excluded, and that under wheat and gram mixed divided by half this year.
2	Gurgaon ..	525	513	..	12	2	
3	Kărnal ..	1,338	1,436	98	..	7	
4	Hissar ..	4,687	798	..	116	2	Since last year the Sirsa district has been abolished and amalgamated with Hissar and Ferozepur.
5	Ferozepore ..		3.773				
			4 571				
6	Rohtak ..	613	557	..	56	9	
7	Amballa ..	2,094	2,094	..	..	..	Statistics not received for two tahsils in Amballa. Area in column 4 given as for last year.
8	Ludhiana ..	1.776	1,329	..	447	25	Reduction this year owing to exclusion of mixed crops.
9	Simla ..	55	35	..	20	36	Last year's area not reliable.
10	Jullundur ..	2,296	3,665	1,369	..	60	This year's area is an estimate. The wheat area this year is greater than usual.
11	Hoshiarpur ..	3,581	2,575	..	1,006	28	Reduction owing to reasons recorded for Delhi.
12	Kangra ..	1,441	1,859	418	..	29	Increase in area not accounted for.
13	Amritsar ..	3.485	3,190	..	295	7	
14	Gurdaspur ..	3,105	3,350	244	..	8	
15	Sialkot ..	3,745	4,043	298	..	8	
16	Lahore ..	3,931	3,758	..	173	4	
17	Gujranwala ..	2,568	2,580	12	..	1	
18	Rawalpindi ..	4,363	5,175	812	..	19	This year is said to have been an exceptionally good one.
19	Jhelum ..	3,041	3,040	..	1	..	
20	Gujrat ..	3,176	3,381	205	..	6	
21	Shahpur ..	2,143	2,174	[illegible]	..	1	
22	Moultan ..	2,379	2,662	[illegible]	..	12	
23	Jhang ..	1,808	1,84[illegible]	[illegible]	..	2	
24	Montgomery..	1,948	1,640	[illegible]	308	16	
25	Mozaffargarh..	1,916	2,065	149	..	8	
26	Dera Ismail Khan ..	2,810	[illegible]	118	..	4	
27	Dera Ghazi Khan ..	2,389	1,542	..	847	35	Heavy damage caused this year by river floods, and area under wheat and barley mixed excluded.
28	Bannu ..	2,726	2,783	57	..	2	
29	Peshawar ..	2,777	3,299	522	..	19	The winter rains came late this year and a smaller area was sown.
30	Hazara ..	1,225	1,293	68	..	6	
31	Kohat ..	995	1,546	551	..	55	No explanation of increased area yet received.
				5,268	[illegible],553		
	Total ..	72,096	73,814	1,718	..	2	

⁂

THE following is a summary of the work done in the Cawnpore Agricultural station for the kharif season of 1884 :—

The manure experiments show that for kharif crops as for rabi, cow-dung is perhaps after all the cheapest and most profitable fertilizer, as it is most certainly the manure most readily procurable by the Indian cultivators.

In this kharif, as in the last rabi, a thorough inversion of the soil proved decidedly advantageous, compared with the mere piercing of the land with the native implement. It is in the end cheaper and gives a larger outturn for the labour worked.

In the experiment ridge-sowing *versus* broadcast-sowing of cotton, the country method came off best. But a further testing must be applied before a final verdict can safely be given.

It appears plain that under existing conditions of Indian cultivation, it is a distinct disadvantage to take two crops of cotton from the same plant. It is better to take the one crop, and then plough up the land in the spring either for another kharif crop or a cereal in the following spring.

New Orleans cotton failed. But there are other varieties which remain yet to be tried, and the successful introduction of an exotic cotton of a more marketable kind than the indigenous variety is not to be despaired of.

In regard to maize, which is a very important crop, it is proposed to attempt in the coming kharif the American method of sowing in hills or squares The secret of the success of this process lies in the free ventilation and sunlight secured to the plants The success of the "hill" or "square" cultivation in America has been remarkable.

The ensilage experiment is still on its trial. If the fodder proves really serviceable to working cattle, there seems every reason to hope that ensilage may yet become an institution in India [illegible]ing. The whole cost of the silo up to packing and [illegible] is less than the cost of digging and lining an ordinary [illegible]ha well, so that on the score of expense the cultivator cannot well complain. [This part of the report has been noticed separately elsewhere.—Ed., *I. A.*]

The matter of ploughs is not an easy one. The same fashion of plough does not suit all soils and all sorts of cultivation. Experience, however, is being gained, and the Duplex plough will shortly be put to a practical test elsewhere.

⁂

Mr. Edgar Vincent, in his report on Egyptian Finance, makes the following remark in regard to irrigation in that country :—

"Considerable prejudice exists in Egypt on the subject of water rates. The Government has so often broken faith with landed proprietors by imposing taxes for water *and not giving any water*, that great difficulty would be encountered in an attempt to increase the revenue by an impost of this nature."

A contemporary, in noticing this subject, makes the following very appropriate observations, in which we generally agree :—

"If the name of India were substituted for Egypt, these remarks would come home forcibly to the Government of this country. Since the days when the Irrigation Department was first established, it succeeded in gaining the name of the 'Irritation' Department. If the officials persuaded the landowners to pay in advance for a supply of water, they irritated and possibly ruined them by giving no water when it was most needed. If they allowed the cultivator to help himself to water on credit, there was a day of irritation awaiting the officials when they tried to enforce their demands, accompanied by no little irritation to the cultivator, because of the manner in which the demands were pressed. It appears from Mr. Edgar Vincent's report that he proposes to re-assess the land tax *de novo* on lands of which the value for agricultural purposes has been sensibly and permanently increased by new irrigation works. This may answer very well in the Government domains in Egypt, but in Lower Bengal where the Government has introduced irrigation works for the benefit of lands against which the demand for revenue may not be enhanced under the Perpetual Settlement, it is left to the awkward alternative of irritating the zemindar by making him pay for the cost of the new works, or of irritating both zemindar and ryot by a direct demand for a water-rate on behalf of those who use the water. The demand may be just—but when the zemindar and the water-rate collector are both attacking the ryots' pocket simultaneously, there is sure to be more irritation than is desirable for the good of the people. No doubt, therefore, as Mr. Edgar Vincent observes, a considerable prejudice exists in India as well as in Egypt, on the subject of water-rates."

⁂

Mr. M. A. Lawson, Director of Government Cinchona Plantations, Parks and Gardens, Nilgiris, has submitted the following report of the causes which have led to so marked a falling off in the receipts from the sale of Cinchona seeds and plants :—

First.—In former years when the cinchona industry was in its infancy and a large number of plantations were being opened out by private growers, there was necessarily a very large demand for cinchona seed and cinchona young plants; and as the Government plantations were the oldest and most noted in the district, the growers naturally applied to Government to supply their needs. This went on for several years, until the new plantations were able to supply their owners with what Government before had only been able to produce. Again, these new plantations are now able to compete with the Government in the sale of seed and plants.

Secondly.—Owing to the great depreciation which has recently occurred in the value of cinchona bark, the public have been deterred from increasing their plantations, or from opening new ones.

The general result of these two above-mentioned circumstances has been a very small demand for Government seed and plants.

The following table shows the miscellaneous receipts for the past eight years :—

		Rs.	A.	P.
During 1877-78	... ...	2,821	2	3
" 1878-79	... ...	8,136	9	2
" 1879-80	... ...	12,300	6	7
" 1880-81	... ...	13,175	4	8
" 1881-82	... ...	6,048	1	5
" 1882-83	... ...	4,200	7	10
" 1883-84	... ...	4,352	6	8
" 1884-85	... ...	1,527	10	5
Total	...	52,562	1	0

The explanation given above is considered "satisfactory" by the Madras Government.

⁂

The following is a summary of Wm. Jas. & Hy. Thompson's Fortnightly Circular of India Tea, dated Thursday evening, 7th May, 1885 :—

Since the date of our last report, 14,500 packges have been catalogued for sale, 2,800 packages of these being Ceylon Tea, and 900 packages reprinted and second-hand parcels.

There was a brisk demand last week up to the date of the Budget announcement, and upwards of 11,000 packages were sold at full rates, the market being sensibly affected by the extensive purchases of retailers, which were being made until the last moment, in order to pay duty.

Subsequent transactions have been very light, only 2,800 packages, principally Ceylon Tea, having been sold this week, and with the pause in business the tone has become quiet; prices, however, are well supported by the competition of those who are anxious to replenish their stocks.

The April Deliveries of Indian and Ceylon were 8,704,000 lbs. as compared with 4,990,000 lbs. last year, which, added to the March delivery, makes a total of nearly one month's consumption taken from the warehouses above the ordinary average; while duty has been paid (on tea in the aggregate) more than two months in advance of the usual amount. Stocks in the warehouses are now 9 million lbs. less than a year ago; this deficiency, however, will be reduced during the next two months, as the clearances during May and June will probably fall considerably short of the quantity cleared last year, *viz.*, 10,5[illegible],000 lbs.

China tea is in a similar position, the stock being 22 millions less than last year—and as much as 34 millions less than in 188[illegible]: prices, however, are hardly at all affected, and the market continues quite devoid of animation.

⁂

Mr. Havel, Superintendent of the School of Arts at Madras, has submitted a report of his enquiries into the arts and industries of certain districts which he was ordered to visit shortly after his appointment. The districts visited were North Arcot, Salem, Tanjore, Trichinopoly, and Madura; but Mr. Havel does not report favourably of the arts and industries there. He discovered nothing new, but he made a valuable collection of specimens of weaving, spinning, cloth painting, metal work, wood-carving, and pottery, which is to be retained in the School of Arts for teaching purposes. He considered that the condition of the arts and industries was decidedly unsatisfactory, for, as Mr. Havel says, not one of them can be said to be thriving, while some appear to be fast dying out. This he attributes to the influx of cheap machine-made articles from Europe, which the general body of the people readily appreciate; and to the spread of European education and ideas. Mr. Havel suggests that the present collection at the School of Arts, together with the collection which he had lately made, might prove the nucleus of an Art Museum for the Presidency, which he thinks would exercise a most important influence upon native art. The question of the formation of an Art Museum has not yet been formally brought under the consideration of the Local Government; but Mr. Havel has been directed to make another tour in other districts during the next cold weather, and a further collection of specimens.

A CONTEMPORARY learns, that the Horse Show and District Fair which was held at Alighur from the 9th to the 14th of February last, is reported to have been the most successful that has ever been held there. One particularly noticeable feature in the fair was the large number of mares and fillies brought to be branded during the Show, which proves the increased demand that is growing up in the district for the use of the Government stallions, and also gives promise of an improvement in the breed of horses in the district. In consequence of this, the Government prizes for branded mares and their produce will be increased in future by the addition to them of the bulk of the district prize fund, the remainder of that fund being chiefly allotted to ponies, a few special prizes being allotted to private-bred horses of distinct merit. Altogether there were 953 country-bred and 183 Cabuli horses, against 683 and 412 at the last Show, whilst 36 remounts were purchased as compared with 8 last year. This number of remounts would probably have been exceeded, but the officers who came to purchase complained that many of the horses best suited for their purposes were not for sale. The highest price paid for a single animal was Rs. 500 for a three-year-old colt, which certainly may be said to be a satisfactory price. The total value of the horses which changed hands is given at Rs. 15,151. As to the other part of the Fair, it appears to have been generally successful, as there were 171 shops opened, against 128 in the previous year, and the dealers are said to have have been satisfied with the results of their sales. The show of carved wood, muslin, cotton cloth, and cotton carpets is reported to have been extremely good, and, in the two last branches, a distinct advance is said to have been made on the former standard of manufacture. The exhibition of live stock, agricultural produce, and agricultural implements was a comparative failure, although they were expected to be among the chief objects of attraction.

SUGAR CULTIVATION IN INDIA.

(Continued from last week.)

THE *Produce Markets' Review*, some 3 or 4 years ago, estimated the outturn of sugar-land in India on an average at 8 cwts. of unrefined sugar to the acre. But the figures we quoted in the last paper on this subject, established the broad fact that the yield is considerably more than the *Review* estimated, which fact was accordingly reported to the Secretary of State by the Government of India. Attention was, at the same time, drawn to a memorandum on the subject prepared and submitted by the firm of Messrs. Thomson, Mylne & Co. who, as large landowners, devote much care to the improvement of indigenous methods of sugar cultivation and manufacture. In this memorandum, it was stated that the average yield of an acre of carefully cultivated land, was 1 1/10 or 1 1/5 tons of crude sugar. This, it will be observed, corresponds closely with the average of 22 cwts. given for many districts in the North-Western Provinces and Oudh, and the Government of India were inclined to think that this was as close an estimate as could be made. We also incline to this view, and cannot think from what source the *Produce Markets' Review* got its information. Though this yield is considerably less than the 2 or 2½ tons which a sugar plantation in the West Indies is said to yield, it does not afford evidence of such extreme inferiority in the sugar-cane cultivation of this country as the *Review* would seem to imply. Of course, exceptional intelligence and capital are employed in this industry in the West Indies, but apart from this consideration, the climatic conditions of India are not quite as favourable to the cane as they are in the West Indies.

We now come to the mode of manufacture practised in India. It must be admitted, in regard to this, that the native methods of expressing the juice and manufacturing sugar, are not only of the most primitive, but of extreme crudeness and simplicity; and, in many respects, inefficient and wasteful. Some improvements have, however, been effected in respect to sugar-mills, which have been noticed in these pages from time to time; and the establishment of large sugar refineries in various parts of the country will gradually tend to better methods of manufacture. But even with the present imperfect methods, the Government of India have ascertained that the profits of the native sugar-growers and manufacturers are large; and that crude Indian sugar, though unsaleable in the London market, finds a ready sale among the native community. It may be observed here, that the natives, to whom a [illegible] refined, crystallised state has been, and is, unknown, [illegible] look for it in that state, and are quite content [illegible] commodity in its crude conditions of *gur*, *rab*, and *khand*. To this circumstance is to be attributed the ready sale with which it meets in the Indian market, and by which the native growers and manufacturers realize such large profits. It has further been ascertained that the price has risen rapidly within the last decade; while in the markets of Northern India, the present wholesale price of undrained sugar, or *gur*, is Rs. 4½ to Rs. 5 the cwt. In the returns for Bengal, much higher prices than the above have been shown against many districts, but in these cases, as already noticed, the produce has been returned in refined sugar, and the price of that description of the article given.

The difficulty of arriving at the total annual production of sugar in British India is much felt by Government. It may, however, be asked, why? If the proper agency is employed in collecting accurate statistics, there is no reason why we should not have as correct information on this as on any other subject. As a matter of fact, the attention of Government has only recently been directed towards this important industry, and consequently when it called upon the various local Governments and Administrations for information on the subject, nothing of the kind ever having been required before, they were unprepared, and the information supplied was necessarily of an imperfect character. Had not the *Produce Markets' Rewiew* called attention to it, and thus attracted the notice of the Secretary of State for India, who in his turn called upon the Government of India for complete statements, the probabilities are that matters might have remained in their pristine condition to the present day. Accepting, however, the figures given in the returns of the area under cane, and assuming the average yield to be some what under 1 1/10 tons of crude sugar to the acre, we have a gross production of about 2,000,000 tons. Add to this, the produce of the 168,262 acres of palm trees, which may be set down at 150,000 tons. The foreign trade returns show that the supply is not equal to the demand. The Government of India have ascertained that the quantity of Indian sugar exported to England, Ceylon, and elsewhere fell off considerably within the five years from 1876-77 to 1880-81, as will be apparent from the figures quoted below, which give the value of the total sugar exports from Indian ports during those years:—

				£
1876-77	...	...	...	925,196
1877-78	...	...	...	745,851
1878-79	...	...	...	204,360
1879 80	...	...	...	205,871
1880 81	...	...	...	311,750

On the other hand, the sugar imports rose from £403,556 in 187[illegible] to £160,157 in 1880-81. The greater part of this sugar, it is said, came from Mauritius, and its consumption appears to have been confined to the Bombay Presidency, where comparatively little cane is as yet grown.

The gross exports of sugar in 1880-81 is put down as having been 534,174 cwt., and the gross imports 986,321 cwts. The net import, therefore, was about 23,000 tons. But as the export was confined to raw sugar, while the imports were refined sugars, the excess of the imports over exports must of necessity have been greater than appears from these figures. In explanation of the dependence of India on other sugar-growing countries, the Government of India observe that many parts of India are unfitted for the cultivation of the cane. The Bombay Presidency, it is said, has to supply itself from Mauritius, while Rajpootana and Central India consume the surplus produce of the North-Western Provinces and the Panjab. They do not, however, consider that the increasing import and decreasing export indicate the decadency of the industry in India. Up to 1882 the area under cane had greatly increased in Upper India through the development of canal irrigation, and it was reported to be extending from the same causes in Bombay. The conclusions arrived at by the Government of India were, that more sugar is produced in India than formerly; but that the demand was much greater; that not only had the increasing prosperity of the people enhanced the average consumption, but that sugar is now borne by rail into tracts where the cane is not cultivated, and which were formerly very scantily supplied; while the profitableness of the industry was apparent from the high price which the Indian husbandman can obtain for his produce. And lastly, that all the evidence before the Government of India led them to the belief that the capital invested in sugar cultivation in India was steadily increasing. In these conclusions we generally agree. The papers before us are not sufficiently complete to admit of a critical examination of the subject; but later correspondence has been courteously promised, on receipt of which we hope to go more fully into the matter.

INDIAN LINSEED.

The Indian public are probably familiar with the paradox that it is difficult to make iron in this country because the ores are so rich. We are now indebted to the India Office for the information that Indian linseed is beaten out of the market at home, because it yields so much richer an oil, than the common Baltic linseed used by the painter and the manufacturer of floor-cloths and linoleum. On the 9th January last, the managing director of the North British Floor-cloth Company at Kircaldy wrote to the Under-Secretary of State for India as follows:—

> It may interest you to know, if you are not aware of it, that a very large amount of linseed oil is used by the manufacturers of floor-cloths (wax-cloth), linoleum, &c., apart from the general painters' work, and that all these not merely prefer but pay a much higher price for Russian called Baltic, linseed oil in preference to Indian or Calcutta linseed oil' the reason being that the Indian seed oil is considered to be too fat, or rich, and devoid of the more readily drying quality of the poorer oil obtained from the Baltic seed oils. Calcutta seed oil is plentiful and cheap, whilst Baltic seed oil is scarce and dear, and I think I pretty nearly give the respective value at [illegible] to £19 10s. per ton for Calcutta and £23 10s. to £24 per ton for Baltic linseed oils.
>
> In this comparatively small town, the seat of the floor-cloth and linoleum trade for Scotland, not less than from 50 tons to 60 tons of linseed oils are used *weekly*. Of course the manufacturers in London, Manchester, and Lancaster, &c., must use a very large quantity, all doubtless preferring and paying a higher price for the poorer quality of oil. No doubt agriculturists prefer the richer qualty, of linseeds for cake for feeding purposes. Perhaps the Indian growers of linseed, were they aware of the higher prices obtained for the Baltic or poorer oils, could readily grow, and at smaller cost, linseed that would serve the purposes for which Russian seed is so much preferred, and for which so much more money is obtained for the oils.

Now, here is one of those great economic facts which shew the vital necessity there is of close observation and research in all departments of the agriculture of the country. There are probably not less than 500,000 tons of seeds exported from India every year, and it is perfectly startling to hear of our linseeds selling for £5 a ton less than the poorer seeds of Russia, because of the very richness of their quality. If the Indian seed commanded but the same price as the poorer Russian qualities, the country would be better off by a million sterling a year. On the 10th January, we read that Mr. **Murray** of Dokerie-Crief addressed the India Office on the same subject as follows:—

> You will have noticed that the commercial papers of Manchester and Glasgow frequently published short extracts from Indian reports on produce. These reports are, however, generally one or even two years old, and though curious as history, are commercially useless. The managers of these papers are, I believe, anxious to give information. The *Dundee Advertiser* has a special correspondent in Calcutta to write news about the Jute trade, but he appears to be a broker, who really knows nothing but jute.
>
> The price of your rupee bills depends not on the past history of India, but on the daily price of jute, wheat, silk, indigo, peas, &c. The commercial world want to have *daily* news about prices in India, just as they have about America.
>
> I am told by Mr. Aytoun, Manager of a large Floor-cloth Work at Kircaldy, that they use fifty tons a week of linseed oil, but that they find Russian oil best; the East Indian linseed is too rich and does not make a hard surface. I have told him how I found it possible to harden East Indian linseed oil by adding rosin to it. This seems unknown here and keeps down the price of East Indian linseed, one of those apparently small details that turn trade. At the same time the cake made from East Indian seed is best for cattle feeding but is not much used at present; the oil is the article that leads the market. I believe you will find the commercial papers quite ready to help in advertising the articles you want to sell.

Now it is quite conceivable that the Indian ryot by sowing upon poorer soils, or by a change of seed might be able to produce precisely the kind of seed which the European manufacturers require. It often strikes us that the waste of the present age must be incalculable, from the want of a 'thinking' department in the affairs of life. Nothing is so painfully conspicuous in modern government or administration, as it is generally called, as the want of leisure for 'thinking.' Men of the most brilliant powers, say, Mr. **Gladstone**, pass their lives under the pressure of such a torrent of work, that they have no time for reflection, for 'thinking,' whatever. It is the same in our merchants' offices. The master and his assistants are absorbed from Monday morning till Saturday night, and too often on Sunday as well, in the drudgery of hard routine work, that leaves them no time whatever for calmly and fixedly concentrating their attention upon the circumstances, the conditions under which their work is carried on. A frantic sort of activity has come upon us all as a necessity, and we work like horses put into the shafts every morning to work all day, until tired out at night, we lie down upon our beds. That the activity of the age is unwholesome, excessive, and morbid, we have felt painfully for many years, and it is even worse in England than in India. It is impossible to mistake the meaning of the hurried gait, and anxious face of every one you pass in the city. The weight of Atlas is upon the shoulders of every man, and he has no time for thinking. The man who thinks is lost. A happy reflection or idea, seizes some man's mind in the course of his business, not because he has patiently concentrated his attention upon it, but by pure accident—and his fortune is made. Were but a little time for thought and observation secured, we should soon cease to find linseed grown of too rich a quality in India.

A BLACK CLOUD WITH A SILVER LINING.

"'A Black Cloud with a Silver Lining,' is the heading of a paper in the *Pall Mall Gazette*, giving Mr. Moreton Frewen's views on the Silver question. We do not mean to take up that intricate question at present, but give the following extract regarding the Indian ryot, to shew the fallacy of the writer's argument:

"What will be the position of the Indian revenue when the rupee has lost still more of its present shrunken value? Take the land tax, a fixed annual payment in Rupees. Formerly the rupee was worth about a florin; how is the revenue deficit to be made good, when the florin has become a shilling? And what will the ryot do? Formerly he exchanged, say six pounds of cotton for a rupee, and ten rupees for a sovereign—that is, for a sovereign's worth of Manchester cotton goods. Now, with this depreciated rupee, if he still exchanges his six pounds of cotton for the rupee, and twenty rupees are required to buy a sovereign, he will have to produce not 60 but 120 pounds of cotton to buy the manufactured goods. So the Indian can no longer buy from Manchester, and the cheapness of raw cotton not being followed by the ordinary demand for the manufactured article, the Manchester spinner must close his mill."

The ryot's standard of value is the rupee, and it does not matter to him whether it requires ten or twenty rupees to buy a sovereign. The price of silver is less to him than the price of gold, and is not a standard measuring the value of the cotton he produces, or the cost of the Manchester goods he consumes. The following figures taken from a Bombay price current will shew that the rupee prices of cotton and Manchester goods have not followed the movements of silver, with that fidelity in the past which Mr. Frewen predicts for the future:—

Bombay.

1867.	Exchange 4 m/st Bill.	English Gold.	Dhollerah Cotton.	8½lbs Grey Shirtings.
	per Re.	per tolah. Rs.	per candy Rs.	per piece. Rs.
April	1/11½ to 2	16-10	215-245	6-13 to 6-15
October	1/11¼ to 1/11½	16-12	155-175	6-11 to 6-13
1870.				
April	1/8 15/16 to 1/9	15-5 to 15-6	170-175	4-12 to 5-12
October	1/8 5/16 to 1/8⅜	18-10 to 18-12	168-175	4-12 to 5-8
1884.				
April	1/7⅜ 3 m/st bill	19-10	200-220	3-8 to 4-12
October	1/7 9/16 to 1/7 11/16	19-14	179	3-8 to 4-12

Cotton, however, is not the only produce for which the ryot gets rupees, and the following table taken from a circular issued by the Bengal Chamber of Commerce, shews that other staples of export have no more followed the lead of silver than cotton has done in Bombay :—

CALCUTTA.

1867.	Gold Australian.	4 m/st B. Bills.	Cotton.	Linseed.	Wheat.	Jute.	Rice.	8¼lb. Grey Shirtings.
	per tolah.		per md.	per md.	per md.		per md.	
April	Rs. 16-8	Rs. 1-11⅞ to 2	Rs. 13 to 20	Rs. 3-10 to 4-10	Rs. 3-4 to 3-8	Rs. 20 per 300 lb	Rs. 2-12 to 3	Rs. 7-14 to 8-6
October	„ 16-7 to 16-8	„ 1-11⅞	„ 14 to 15	„ 3-14 to 4-4	„ 2-6 to 2-8	„ 17 „	„ 2-14 to 3-2	„ 6-14 „ 7-2
1876								
April	„ 17-[illegible]	„ 1-8¾ to 1-8 15/16	„ 13-8 to 14	„ 3-3 to 3-10	„ 2-6 to 2-8	„ 20-8 to 21-8 p. 350 lb	„ 2-6-6 to 2-7	„ [illegible] „ 5
October	„ 18-4	„ 1-8 to 1-8⅜	„	„ 4-2 to 4-9	„ 2-6 to 2-12	„ 22 to 22-4 „	„ 2-3 to 2-6	„ 3-14 „ 4-10
1884								
April	„ 19-14 to 18-12	„ 1-7⅞ to 1-8 1/16	„ 15-4 to 16-4	„ 3-13 to 3-14	„ 2-8 to 2-11	„ 27 to [illegible] p. 400 lb	„ 3-3 to 3-5	„ 3-9 „ 4-9
October	„ 19-1	„ [illegible] 21/32 to 1-7¼	„ 14 to 14-4	„ 4-4 to 4-6	„ 2-4 to 2-8	„ 19-8 to 20-8 „	„ 3-3 to 3-5	„ 3-8 „ 4-8
1885								
April	„ [illegible]-8	„ 1-7 to 1-7¼	„ 15-12	„ 3-14	„ [illegible] to 2-9	„ 21 to 24 p. 400 lb	„ 2-12 to 3-5	„ 3-8 „ 4-7

The depreciation of silver has been of great benefit to the ryot by cheapening, as it undoubtedly has done, the *Sterling* cost of his produce, and increasing his customers, while at the same time extended railway communication and the Suez Canal have accelerated and cheapened transit, since the days when a rupee was worth a florin. A glance at the above figures will shew that now-a-days the ryot, as a matter of fact, gets as many, if not more rupees for his cotton and produce, more yards of Manchester cloth for his rupee, than he did in the halcyon days of two shillings per rupee exchange.

The abolition of import duties, cheap transit, and the competition among European merchants, whose commissions are just one-fifth of what they *were* in 1867, have combined to cheapen to the Indian consumer, not only his clothing, but everything else he wants from Europe, with the single exception of gold. Gold is a luxury for which he can easily afford to pay, and is willing to pay, as the increased imports of the metal in the last few years shew. It may be advanced that if silver were dearer, or exchange at two shillings, the consumer would benefit the more. We do not, however, concern ourselves with speculations at present, but call attention to [illegible] culled from the dry reading of commercial reports.

The important fact which stares us in the face, in considering this question, is the position not of the ryot, but the position of Government in view of the further depreciation of silver which the abolition of the Bland Bill in America would undoubtedly cause.

There will be a large increase of warlike expenditure to [illegible] during this financial year, and as this expenditure may be looked upon as an insurance premium paid for peace, to enable the ryot to cultivate his produce and consume his Manchester goods in comfort, the ryot should pay the premium. In the 19 financial years from 1866-67 to 1884-85, the net imports of gold and silver into the country aggregate 168 crores of rupees, and the figures for the past four years are somewhat startling :—

NET IMPORTS.

		Gold. Rs.	Silver. Rs.	Total. Rs.
1881-82	...	4,84,39,242	5,37,99,499	10,22,30,841
1882-83	...	4,93,08,715	7,48,02,269	12,41,10,984
1883-84	...	5,46,33,166	6,40,61,640	11,86,94,696
1884-85	...	4,67,33,868	7,24,58,254	11,91,92,122

What becomes of all this wealth, may be asked? It does not go to build railways, make canals, or encourage any enterprise of public utility, or benefit to the country, but goes mostly in the manufacture of jewellery or is hoarded up. The fact that the Raja of Burdwan has some nine crores of Rupees lying idle in the vaults of his palace, proves hoarding, a practice which is followed largely not only by the independent Princes, but also by all classes in the country.

There is some talk of an income-tax, but past experience has shewn how unprofitable and how difficult a tax it is to collect, and we are of opinion that the increased produce of the land should pay more than it does now. We do not advocate export duties, which would handicap the producer in the race with other countries producing cotton, wheat, and seeds, but we do advocate a return to import duties as a fair financial expedient.

When the salt duty was reduced, it was looked upon as a reserve to be drawn upon for famine or war expenditure, being easily collected. The reduction of duty has not increased the consumption to a greater extent than the increasing prosperity of the country justifies, and a considerable increase of duty would not curtail consumption. Gold as a luxury should be heavily taxed, and an import duty on silver is due to a Government which has to meet its obligations for the benefit of the country in gold. The relative value now of cotton and Manchester goods, as compared with 1867, points to the latter as a fit subject for an import duty. Import duties are easily collected, and are fairly distributed over the classes who reap the benefit of the stability of the Indian Government.

NOTE.—The statistics in this article are most valuable, and must have occasioned much trouble to the writer. With some of his conclusions, we agree fully, but there are others which we cannot accept.—ED., *I. A.*

EMIGRATION FROM INDIA.

THE Resolution of the Bengal Government on the Colonial Emigration Report for 1883-84, published in the *Calcutta Gazette* of the 7th instant, furnishes some interesting particulars, on the subject of emigration from India to the Colonies, for which special facilities were offered by the Government during the year under review. The health of the emigrants was cared for, and the voyages were so timed that they might arrive at the Colonies at the most healthy period of the year. There were eight Agencies at work during the year, as in the previous year. The British Colonies of Mauritius, Trinidad, Fiji, St. Lucia, Demerara, and Natal all imported emigrants from India, and the Dutch Colony of Surinam and the French Colony of Guadeloupe also had their share. The total number called for by the nine Colonies was 17,094, and the total number forwarded was 10,260, being 6,979 short of the requisition. The following table shows the numbers required by each, and the numbers actually despatched :—

		Under requisition.	Despatched.
Demerara	...	6,000	2,537
Trinidad	...	3,205	2,470½
Fiji	...	2,100	1,401½
Mauritius	...	990	1,135
Natal	...	1,324	475
Surinam	...	1,800	1,355½
Guadeloupe	...	900	585½
Jamaica	...	none	......
St. Lucia	...	775	none
Total	...	17,094	10,260

THE
INDIAN AGRICULTURIST.

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[illegible] CALCUTTA.—SATURDAY, JUNE 20, 1885. [No. 25.

Crop and Weather Report.

[For the week ending June 16, 1885.]

[illegible] has again fallen throughout the Madras Presidency, and prospects have slightly improved in the worst [illegible]. Relief works will, it is reported, be stopped [illegible] the current month, if season continues favourable. The [illegible] is still below the average in most districts. There has [illegible] the Mysore State, improving the crops and facilitating [illegible] operations. In Coorg good rain has fallen, and ploughing is [illegible]. In Bombay rain has been general, and the *kharif* [illegible] commenced in places.

[illegible] has fallen in two or three places in the Punjab, but more [illegible] Provinces and Oudh. The *rabi* has been harvested [illegible] Provinces and *kharif* operations are in good progress [illegible] Central Provinces some rain has fallen in most [illegible] *kharif* preparations continue, and sowings have commenced. [illegible] in the Berars and Hyderabad, and in the Central [illegible] States, and agricultural prospects are generally [illegible].

[illegible] rain fell in all districts of Bengal Proper, but rain still holds off in Behar, and there have been only slight showers in Orissa and Chota Nagpore. The rain has been of some benefit, but much more is still needed for sugarcane, jute, indigo, and the rice crops; and for the [illegible] of the aman crop generally, as well as for the sowing of [illegible] in Behar. Rain continues to fall in Assam, and ploughing [illegible] in progress. Red spider and blight are reported to [illegible] in Cachar.

[illegible] is generally fair.

[illegible] except in Bengal, were they show an upward [illegible].

[illegible]—General prospects fair; slightly improved in Bellary and [illegible]. Relief works will be stopped by end of June, if season [illegible].

[illegible] throughout the Presidency. Preparation for *kharif* [illegible] in all districts; *kharif* sowing in progress in parts of [illegible]; scarcity of drinking-water in two, and [illegible] of Dharwar. Cholera in parts of sixteen, small-pox [illegible], and fever and cattle-disease in parts of eight [illegible].

[illegible] less rain fell in all districts of Bengal Proper, except [illegible] 24-Pergunnahs; rain still holds off in Behar, and [illegible] slight falls in Orissa and Chota Nagpore. The rain has [illegible], but much more is still needed for the safety of the [illegible] jute, indigo, and aus crops, and for the cultivation [illegible] generally, as well as for the sowing of the *bhadoi* crops [illegible] nearly all over the province, with a tendency to [illegible]. Public health is generally spoken of as fair, [illegible] in several places, owing to intense heat [illegible] cases of small-pox reported from [illegible].

[illegible] Public health good; cholera [illegible].

[illegible] Ferozepore, Mooltan, Shahpore, and Rawalpindi [illegible] in the Peshawar district; few cases of [illegible] of remaining districts good. [illegible]

[illegible]

Assam.—[illegible] doing well.

Mysore and Coorg.—Ploughing [illegible]. Prices of food-grains slightly risen. Prospects of [illegible] good.

Berar and Hyderabad.—Preparation [illegible] continues. Cholera in [illegible] taluka has [illegible]. Public health good. Prices—wheat 12, [illegible] 17 seers per current [illegible] rupee.

Central India Agency.—Weather hot and cloudy. Slight cholera in Bakhtgarh and Manpur, otherwise health good. Prices low.

Rajputana.—Weather very hot. Cholera reported from most [illegible], but not in epidemic form. Health good.

Nepal.—Weather hot; rain wanted. A few cases of cholera in the valley.

Letters to the Editor.

SEEDLINGS FROM FRUITS.

TO THE EDITOR.

SIR,—Referring to the letter of your correspondent, [illegible] D. Jones, of Bhavnagar, which [illegible] your issue of the [illegible], I beg to offer a few remarks on the [illegible] of mangoes raised from seeds.

The general belief among cultivators [illegible], that mangoes grown from seeds, the fruits of which have been eaten, invariably produce inferior [illegible], and the cause which they assign for such [illegible] that the seeds are affected by the saliva of the [illegible] poisoned by it, is inconsistent. If we are to believe the saliva theory, how is it then, that seeds of choice [illegible] fruits, though the pulp had either been [illegible] ed, without the seeds being touched [illegible]? The saliva theory is nothing but [illegible] prevalent among the ignorant malees and [illegible]. It is only put forward by the ignorant, [illegible] gardeners and cultivators, who do not [illegible] for such seedlings, to sow such seeds [illegible]; or to dig pits for sowing or transplanting mangoes. [illegible], however, to prevent deterioration in mango-seeds, mix [illegible] and rabbit's dung well together in water, and [illegible] affected with saliva or well [illegible] for [illegible] hours. It must be [illegible] separate pits (each seed in its own pit) [illegible] seeds are to be planted [illegible]. When the seeds have germinated [illegible]

[illegible]

[illegible]

[illegible] 1885.

Editorial Notes.

We hear that Mr. M. Finucane, C.S., the newly appointed Director of Agriculture, Bengal, has lately returned from Darjeeling, and is engaged in organising the new Agricultural Department under the Local Government.

⁂

The Civil and Military authorities in Madras have been discussing the question of control over certain stone quarries situated within the limits of the Bellary Cantonment. After a lot of unnecessary correspondence, it has been decided that the control is to be vested in the hands of the Military authorities But red-tapeism must run its course !

⁂

The *Farmer's Review* says that the latest cure, or kill, for the cabbage worm is ice-cold water liberally sprinkled on the heads during the heat of the day. The worms, it is claimed, under this cold-water treatment, curl up, roll to the ground, turn up their toes, and die, while the cabbages themselves are all the fresher for the treatment. The right temperature of the water is readily maintained by keeping a good-sized piece of ice in the sprinkler. Cabbage growers will do well to *paste* this in their hats.

⁂

The preservation of timber is a matter of much importance in India ; and the following might be noted by those interested in the subject :—A farmer, writing to one of our American contemporaries, says that twenty-five years ago he set split white oak posts for his garden fence, putting about a peck of air-slacked lime about each, and they are all good yet. He attributes their good condition to the effect of the lime, in which he is doubtless correct. A board that has been used in a mortar bed, and thoroughly saturated with lime, is almost indestructible from decay. An addition of salt to the lime would, we think, if possible, give still better results in preserving the wood.

⁂

We see that the Land Improvement Loans Act., XIX, of 1883, came into force in the Punjab on the 1st instant, and the new rules for its application have been published in the Local Gazette. Under these rules, Deputy Commissioners are empowered to grant loans, not exceeding Rs. 1,000, for any one improvement, and loans above that amount will require the sanction of the Commissioner ; but if the sum exceeds Rs. 5,000, the sanction of the Financial Commissioner becomes necessary.

⁂

The prospects of the indigo districts in Bengal are more favourable. Good rain has fallen throughout Krishnagar, Jessore, and Midnapore. The ultimate result of the season will now depend a great deal on an early or late inundation. The reports from Moorshedabad are not so favourable, as rain in that district has been only partial. Rain is still badly wanted in most parts of Behar, though during the last few days the weather had become unsettled and rain was expected. No fresh news has been received from Benares or the North-West Provinces.

⁂

The reports from the tea districts state that the weather generally in Assam had been too cold, and sun was wanted to encourage the flushes. Rain was, up to a late date, also much wanted in Cachar and Sylhet ; but according to the latest news, some good rain has since fallen, which may help to clear off the blight in Cachar where it has been very prevalent. There has also been heavy rain in the Terai and Darjeeling districts, and this will help to clear off the red spider and green fly, from which a large number of gardens have been suffering.

⁂

There is such a desire in the breast of the ordinary government official to tax salt, that even the salt used for curing fish was not exempt. It is, however, satisfactory to learn that " on reconsideration " the Government of Madras have come round to the opinion that it would be better to forego all duty on salt used for curing fish, having regard to the advantages to the public which will accrue therefrom. The Government even go further, and have ordered that the present system of supply at cost price is to be continued ; and the Revenue Department is to make it a point of suggesting measures for extending the benefits of the system.

⁂

The following is a summary of the usual Monthly Return of Shipments of Tea from Calcutta, issued by the Indian Tea Association :—

	1885. lbs.	1884. lbs.	1883. lbs.
Exports to Great Britain in May ...	1,275,316	718,627	277,366
Exports to Australia and New Zealand in May	22,689	5,120	9,018
Exports to America in May ...	40	3,980	3,925
Exports to other places in May ...	8,561	8,893	14,515
Total Exports in May	1,306,606	736,620	305,824

The increase in 1885 is remarkable. It would seem that the Americans are not great tea-drinkers, at any rate they don't seem to patronise Indian Teas to any great extent.

⁂

We publish elsewhere a Resolution by the Local Government, on the distress said to be existing in certain parts of the Moorshedabad district. We are very glad to believe that our district officers are watching the condition of the people carefully. We have no means of verifying that condition ourselves, but that suffering is very wide-spread in the provinces, there can be no doubt, and it is idle to complain of our public officers being " set upon useless investigations," with such testimony as that of Mr. Taylor and Mr. Coxhead in our hands. At the same time, we would urge the correspondents of the Press to shew more care than they sometimes do, in verifying the stories they send to the papers. The *Bungabasi*, in the present case, might enquire, we think, of its correspondent, how he came to exaggerate so greatly the distress in the Kargram thannah.

⁂

We have before us a report by Mr. C. Benson, Agricultural Reporter to the Government of Madras, on a letter written by Mr. C. Kristnasawmi Mudaliar, in which he describes his method of cultivation with improved ploughs, and the cost incurred by him in his several experiments. His letter is an interesting one, and consists mainly of answers to certain questions put to him by the Agricultural Reporter. Mr. C. K. Mudaliar has proved himself to be a practical agriculturist, and has well earned not only the gold medal presented to him by the Government of Madras, in recognition of his successful efforts towards agricultural improvement, but the badge of a Companion of the Order of the Indian Empire, conferred upon him by the Viceroy. We trust that this public recognition of Mr. Mudaliar's services to agriculture, will induce other private landholders to emulate him in this direction.

⁂

We are very glad to find that the Madras Government have accorded their approval to a proposal of the Director of Revenue Settlement and Agriculture, to substitute presentations of live and dead stock for the money prizes, which it has hitherto been the custom to distribute at Agricultural Exhibitions. This is a move in the right direction. In a scheme like this, which has for its object the improvement of stock, and the encouragement of those engaged in stock breeding, it is to be expected that the Government will have to spend large sums of money at the beginning, without anticipating anything like an appreciable return for a very considerable time to come. Let us, however, hope that the advantages that will accrue to the country will be a sufficient return for a time at least. Improved cattle and machinery in agricultural pursuits mean improved cultivation and revenue, and a general improvement in the condition of the people.

⁂

Forest Conservancy in the Tanjore District does not appear to have worked satisfactorily. The revenues from this source have been gettting " smaller by degrees and beautifully less." They have sunk from Rs. 13,000 in 1881-82, to Rs. 6,971 in 1882-83, and to Rs. 4,466 in 1883-84 ; while the current year's estimate of Rs. 10,000 is expected to fall short by Rs. 3,000 !

while its sources, as pointed out by the Conservator, are distinctly of a non-permanent character. So that, having regard to the requirements of conservancy, no more than Rs. 4,000 is to be expected as the average income of the next ten years, as compared with an expenditure aggregating Rs. 8,700 per annum. With matters in such an unsatisfactory state, it is difficult to understand why operations should be continued at all. The system of tenures in Tanjore seem to be of a complicated nature; and either the Conservator has misunderstood them, or the Government. It seems clear that the system requires to be thoroughly reorganized if anything like satisfactory results are to be expected.

⁂

IN recommending the desirability of adopting a uniform scale of colors for the illustration of agricultural statistics in maps the Statistical Conference of 1883 framed the following resolution on this subjects:—

"That as agricultural statistics can often be conveniently represented by means of colored maps, it is desirable that a uniform system of representing percentages by particular colours should be adopted, but that the Conference is not at present able to decide which system is the best. An essential point is, that color cakes, and not colours mixed on a palette, should alone be used, and that the paint boxes should be of the same kind."

The Government of India in the Revenue Department, in consultation with the Surveyor-General, have decided upon a scale which is described as a simple ascending scale, which will be generally employed in showing percentage above zero of rainfall, crops, irrigation, and the like, over different areas. The amount of difference in percentage to be indicated by the different colors in the scale will be left to the discretion of Local Governments and Administrations.

The maps are to be colored by hand, and to facilitate this, the Stationary Department will supply to Local Governments and Administrations, small boxes containing colors in cakes corresponding exactly with the prescribed scale. As soon as a given scale of percentages is adopted, the percentage which each color is to express is to be clearly shown on a label fixed to the inside of every box.

⁂

FURTHER telegraphic news from Srinugger, dated June 11, regarding the earthquake in Cashmere, states that the Resident has visited Sopor and Baramulla, and is now encamped at the latter place. He found both towns in ruins. At Baramulla, 225 persons were ascertained to have been killed, and 175 at Sopor. The reports from the outlying villages are incomplete; but those received showed great loss of life among the villagers, sheep, and cattle. The ground on both sides of the river from Sopor to Baramulla is scored with cracks, also in the low alluvial hills in the vicinity. The severest shock, since the first, occurred at noon on the 8th, causing heavy landslips. There is a comparatively small number of wounded who were receiving every possible attention from the Maharajah's native doctors, under the suprientendence of Dr. Neve, of the Church Missionary Society. The accommodation being very defective at Baramulla, Dr. Leahy, who acompanied the Resident, has arranged to take the worst cases to Srinugger. The Governor and officials are all exerting themselves to the utmost by the distribution, by the Maharajah's orders, of money, clothing, and rice.

The Viceroy has telegraphed to the Maharajah, expressing his regret at the great loss of life and the destruction of property caused by the earthquake, and his sympathy with the sufferers.

⁂

IT may be remembered by some of our readers, that one of the chief subjects of consideraation in the relief measures of 1873-74, was the amount of food to be given daily to the people, who were to be fed at the expense of the State. Sir GEORGE CAMPBELL estimated the requirement at ¾ of a seer, or 1½lbs., and after long consideration Sir RICHARD TEMPLE adopted this scale, and urged it upon the Government of India. He wrote:—

> In practice it is found that, even to ordinary paupers who did not do any work, local committees had to give ¾ of a seer of rice daily, besides one pice for the purchase of salt and condiments. To women in delicate health, and to persons reduced by previous hunger, *a still larger daily dole had to be allowed.*

The Secretary of State at the time was the Duke of ARGYLL, and when the question was referred to him, he ordered the adoption of the highest scale proposed, declaring that "It was better to be on the safe side, and to give the people a fraction more than was absolutely essential, rather than a fraction less." Now the Lieutenant-Governor of these Provinces has reduced the relief to less than one-half the scale thus adopted in 1873-74. For the scale proposed by Mr. TAYLER, and approved by Mr. BEAMES and by the Lieutenant-Governor, is two pice a day for adult men and women, and one pice for children. As the price of common rice is about 12 seers the rupee, this scale of relief will purchase about 12 ounces of raw rice for the adult, and 6 ounces for the child, and we naturally want to know who is responsible for the step. It can hardly have been adopted without reflection, but the fact remains that the relief we are now administering is less than one-half the lowest scale permitted in 1873-74.

⁂

THE *Straits Times* of the 4th of June has the following regarding the race for tea:—The S. S. *Glengarry*, Captain Alfred Taylor, carrying the first season's teas, arrived alongside Tanjong Pagar wharf, at 9 o'clock on Saturday night, and after taking in a thousand tons of coal, proceeded on her voyage at 4 A. M., on Sunday. The *Glengarry* had 4,000 tons of tea at £3-10., and left the red buoy at 5 P. M., on the 23rd ultimo, making the passage to this port in 7 days 4 hours. The second steamer with teas was the China Shippers' Mutual Company's steamer *Oopack*, which passed Woosung at noon on Sunday, the 24th May, arrived alongside the Borneo Company's wharf at 6 o'clock last Monday morning, (7 days 18 hours) and took in 950 tons of coal in 3 hours, leaving the wharf at 10 A. M. This is believed to be the fastest job of coaling ever executed in Singapore, and reflects great credit upon Mr. Rose, the Company's Superintendent. Messrs. Wheelock and Co's Shanghai freight circular for the mail contains the following about the tea steamers:—From Hankow for London—The steamers *Glengarry*, *Glenfruin*, *Oopack*, *Benvenue*, *Pembrokeshire*, *Cyclops*, and *Pathan*, have already proceeded up the river to load New Teas. These will be followed by the *Bothwell Castle*, *Afghan Aberdeen*, *Bentarig*, and either the *Glenfalook* or the *Glenroy*. The *Glengarry* will be the first steamer away, and for her £6 per ton is now being asked, but rates cannot be definitely settled as the *Pathan*, *Afghan*, and *Aberdeen* have not been admitted into the Conference, so there is every probability of great opposition in securing freight, and the consequent resort to low rates. For New Teas, to Russia direct, the *Massalia*, *Tsaritsa*, and *Russia*, have already proceeded to Hankow. From Foochow to London, *via* Suez Canal:—The *Gleneagle*, *Ningchow*, *Denbighshire*, and 'Ben' steamer will load with New Teas at the opening of the season. For New York, *via* Suez Canal:—The berth is still vacant, but the steamers *Glenavon*, *Glamorganshire*, *Lord of the Isles*, and *Strathleven* have been settled to load with New Teas at Japan and China ports, and another Union Line Steamer will be laid on. The *Glenavon* will proceed to Amoy from Japan, but will take through freight from here at current rates.

⁂

THE use of gypsum as a manure has often been discussed. In most cases it has been found that its effects on soils was of a negative kind, unless the soil to which it is applied is deficient in the two important elements that make up this substance, *viz.*, lime and sulphur.

Our own views on the subject are borne out by the testimony of a writer in the *North British Agriculturist*, who has evidently studied the subject. He says: Do, or do not, the soils in which it is to be used contain sufficient lime and sulphur for the use of corps? Most of the red soils do contain sufficient of these, unless they have been exhausted by cropping; but it must be borne in mind that all artificial manures, of which superphosphate is the basis, contain gypsum, the result of the application of sulphuric acid to the carbonate of lime found in combination with the phosphate of lime, of which superphosphate is made. It will be manifest, then, to apply gypsum in itself to a soil in which there is either sufficient, naturally or artificially, will be disappointing. If gypsum could be obtained sufficiently cheap, there is no doubt it could be used as a purifier of the soils, because the sulphur in it, set at liberty, is deadly to all fungoid or other low forms of organic life that produce many of the diseases of farm plants. But where the gypsum is made from the natural rock, it cannot be used in sufficient quantities to economically do this. Where the waste products of manufacturers can be had for carting away, it is an admirable substance for cheaply regenerating worn-out land and freeing it from injurious or destructive insects of all kinds, and also of weeds and rubbish. But it must be used with judgment, for if too much is applied, say, to the stubbles after harvest, and ploughed in, it will not have time to allow the rains to wash away the injurious matters often found with gypsum from the refuse of chemical works, and the succeeding crops might suffer. The gypsum from the natural rock may, however, be freely and safely used on almost all occasions without doing any harm, the only question being : Will it do sufficient good to make it economical? Liebig and other chemists expected great things of it, and thought in its decomposition in the soils it would fix the carbonate of ammonia in the soils, and in the atmosphere and rain water, dews, &c., and keep the soils dressed with it abundantly supplied with ammonia. No doubt it does this to a certain extent, but though the writer tried it for several years, he came to the conclusion it was only in soils deficient in sulphates and lime that it can be used economically as a manure by itself. It is, however, of very great use as a drier, or as a dilutant to enable concentrated manures to be spread more evenly.

⁂

The following is a Summary of the Weather Reports for March and April 1885, as furnished by the Meteorological Reporter to the Government of India :—With but few local exceptions, March and April were characterised by high atmospheric pressure, and the latter month by an unusual depression of temperature. The pressure remained above the average during the greater part of March, but about the 20th it fell and remained low up to the end of the month. It continued falling, on the whole, till the 7th April, when a slight recovery took place, and amid some oscillations it remained above the normal average till the end of the month. In March, it was most above the normal in Northern India ; least so in the Peninsula. In [illegible] April also, the pressure was, on the whole, above the [illegible] average except in Assam and Bengal, where it was [illegible] somewhat below it. On the 27th or 28th March rainy weather set in in the Punjab and on the North-Western Himalaya, and continued at intervals till the 9th April. This rai[illegible] was accompanied with snow on the hills, and these fall[illegible] were repeated at the end of the latter month, when [illegible] with so[illegible] rain again set in in the Punjab, and dust-storms [illegible] rain occurred more or less over nearly the whole of Northern India. Except during the rainy periods, dry north-westerly winds prevailed over the greater part of Northern India, sometimes extending as far east as Bengal, and across the Satpuras to the Deccan. On the Malabar Coast, the winds were most frequently from the north-west, sometimes north, and the same in the Northern Deccan. On the East Coast, the winds were steady from south or south-west. In March, the mean temperature differed on the whole but little from the average. In April it was unusually cool over the whole of North Western and Central India, and the greater part of Bombay and especially in the Punjab, Rajputana, Sind, Guzerat and Khandesh, where the mean temperature of the month was from 4° to 8° below the normal. The humidity of the air was slightly in excess in the Punjab and the Central Provinces ; in general deficient elsewhere. The rainfall returns show that no rain fell in Cutch, Guzerat, and on the greater part of the Western Coast ; and in the Peninsula the rainfall has been very deficient. In March no rain fell in the Konkan or in Guzerat, and less than usual in North-Western India. In April, on the whole, there was an excess in Assam, Cachar, and Northern Bengal, on the one hand, and in the Western Punjab on the other, while there was a general deficiency over the whole of the Peninsula. The heaviest falls took place in Assam. Silchar having 26 inches of rain, and Sibsagur about 17½ inches. The greatest local excess during the two months was :—

7½	inches	at	Peshawar.
6½	„	„	Murree.
7	„	„	Darjeeling.

In April alone Silchar registered about 9 inches above the average.

⁂

Mr. J. N. Atkinson, special Assistant Agent, Godaveri, has been devoting a good deal of attention to the introduction and culture of Tassar Silk in the Bhadrachalam taluk. His efforts have not been attended with marked success, but they go to show that much may be expected in time if the matter is taken in hand properly. Mr. Atkinson's report is so interesting, that we give the substance of it below :—

In 1881-82 he found large quantities of tassar silk cocoons lying about the Bhadrachalam jungles and determined to try and establish sericulture as a regular branch of industry in the taluk. He collected some fifty or sixty live cocoons, intending to divide them between the Central Jail, Rajahmundry, and the Rev. Mr. Cain, at Dumagudiem, who was anxious to help him. Unfortunately all the cocoons were by mistake sent to the Central Jail. The then Superintendent, Major Pickance, took a great interest in sericulture and succeeded in getting a small crop of eggs, his great difficulty was in getting connection established between the males and females. But no formal report by him on the result of his efforts appears to have been made, and that since he left the jail the attempt to carry on sericulture has been abandoned.

The Rev. Mr. Cain was also anxious to start sericulture at Dumagudiem. At the same time Mr. Atkinson used his utmost endeavours to interest the Koyis and the taluk officials in his experiment. But neither Mr. Cain nor he could overcome the hopeless apathy of the people, and he was obliged to make a fresh departure.

Knowing that at Mangapet, in the Nizam's dominions, a village on the Godavrei some distance above Dumagudiem, sericulture was carried on by a large number of people, who live solely by it, and must therefore make a profit out of it, he determined, if possible, to import one or two professional sericulturists, and to try and persuade them to settle in the Bhadrachalam taluk permanently. He succeeded in getting two men to come from Mangapet to Bhadrachalam, and promised them that until they were able to make a profit by their trade in their new home, their wages at Rupees 6 each per month, would be paid.

The two men came in June of last year, and after examining the jungles in the neighbourhood of Bhadrachalam settled at Cheruballi, near the Bustar frontier, and commenced operations by the end of June. The first crop of silk was said to be good, the second was in great measure lost owing to heavy rain, and the third was a fair crop.

Towards the close of last year when the third crop of silk was almost all gathered, it became apparent that the two cultivators had no intention of settling in the Bhadrachalam taluk. They made the usual excuses that it was not their native country, that they could not live there, and so forth. And as no good was likely to come by forcing the men to stay, they were on the 15th January last, after the whole of the third crop had been gathered and stored in safety, allowed to go. The men were Koyis, and he was disappointed that he could not persuade them to stay. Mr. Atkinson was still more disappointed that not a single man in the Bhadrachalam taluk, Koyi or otherwise, evinced a desire to adopt the new means of livelihood presented to them. As a matter of fact, he believed the real objection to learning or carrying on the trade was an absurd superstition that prevails as to the manner of life that must be followed by the sericulturists during certain portions of the process of cultivation, involving abstinence from sexual intercourse and other hardships.

The immediate results of the experiment were as encouraging as could be hoped. From the thirty cocoons which formed the breeding stock to commence with, he got about 15,200 cocoons, of which, roughly, two-thirds are in fair order and imperforated, the remainder not having been boiled early enough, or properly, being perforated. These have been forwarded to Messrs. Simson Brothers, who have undertaken to consign them to their agents in Europe and ascertain the value of the crop.

The sum expended on this experiment, was Rs. 93-14-2.

The following important observation we quote in Mr. Atkinson's own words :—

"That the country itself is suited for silk culture is proved by the large quantities of wild tassar cocoons which may be found lying about the jungles. Now, if sericulture can be carried on at a profit in Mangapet, I cannot see any reason why it should not be equally easy to do the same in the Bhadrachalam taluk? Indeed, it ought to be easier, seeing that Bhadrachalam lies so much nearer the great central marts of Rajahmundry and

Cocanada, than Mangapet is to any large town at all. It is certain, too, that any private person carrying on the trade could do so cheaper than I did. It might be combined with an agricultural life—nay, it might easily be carried on by women and children without interfering with other business. Then again it is not a mere question of pecuniary profit. But I think Government should not lose sight of the immense benefit to be derived from the provision of a new means of livelihood in a country where agriculture is almost the only calling, and yet where the agricultural produce of the country is altogether insufficient for the mere sustenance of the inhabitants."

The introduction of a new industry, such as silk cultivation and silk weaving, will help very much to civilize and raise the people. And in the wild inaccessible tracts like the Bhadrachalam taluk, it is assuredly a legitimate function of Government to use every means of spreading civilization.

Further efforts might be made on behalf of Government to acclimatize this new industry in the taluk.

The Madras Board of Revenue made the following paradoxical remark on Mr. Atkinson's report :—"Perhaps the abundance of the tassar cocoon in the jungles, is a bar to the introduction of sericulture on an extended scale in the Bhadrachalam taluk."

But the Madras Government took a different view of the question, and remarked, that "the Bhadrachalam jungles would appear to be an excellent field for experiments."

DERA ISMAIL KHAN SETTLEMENT REPORT.

THE settlement of the Dera Ismail Khan District, which occupies an area of 9,296 square miles, being the largest comprised in any district in the Punjab, was first commenced by the Settlement officer, Mr. St. G. Tucker, in 1872, and completed in 1879, at a nett cost to Government of Rs. 4,04,702. The Government of India in the Foreign Department, to whom the report was submitted, consider that the money has been well spent.

It is stated that only one-seventh of the entire area is cultivated, and that the district stands thirteenth among the districts of the Province, in point of extent of cultivation. Two-fifths of the area are situated trans-Indus, and the remaining three fifths lie cis-Indus. It is divided into three strips of country running north and south, *viz.*, Daman, or flat level tracts, Trans-Indus ; Kuchi, or low lands, situated on both sides of the Indus, and subject to its floods, and the Thal, or sandy wastes, which bounds the districts to the east. The cultivated area amounts to 806,000 acres, of which rather more than half is unirrigated. The average rain-fall is less than nine inches. The area irrigated by river floods is stated to be 196,000 acres ; by wells, 93,000 acres ; and by mountain torrents, 81,000 acres. Of the cultivated area, 326,000 acres are held by Jats ; 245,000 acres by Pathans, and 134,000 acres by Beluchis. The principal crops are wheat (319,000 acres), bajra (263,000 acres), with sarsou, (mustard), cotton, jowar and ussum. The proportion of the area cultivated by tenants is comparatively large, being 320,000 acres, or nearly one third of the whole. The area held by occupancy tenants, who number 9,668, is 131,000 acres. The population, according to the last census, was 441,649, giving a rate of 47 per square mile of the total area, and 351 per square mile of the cultivated area. The number of Hindoos is insignificant, being only 54,000.

Although the Settlement officer has not given any separate account of the present prosperity of the district, as compared to former years, yet it appears that in one Tahsil the number of wells has increased from 645 to 726 ; and the cultivated area in another more than double that of 1854 and 1861 ; and the selling price of lands has also increased. Generally speaking, the people are said to be well-to-do, the only unsatisfactory feature being the amount of mortgage debt existing in it. But this subject, we find, is receiving the separate consideration of the Punjab Government.

The system of land tenures is described as exceedingly complicated, and possessing features which are markedly different from those found in any other part of the Punjab. A full account of these is given by the settlement officer, and need not be described here in detail, suffice it to say that the people are divided into superior and inferior proprietors. The former also hold land as inferior proprietors, and cultivate them on the same tenure as any other class. The superior proprietorship is usually held undivided under the zemindari form of tenure. It consists of a payment of Rs. 1-12-0 per cent on the revenue, together with certain rights in the common land which is generally considered the property of the superior proprietors, subject to certain privileges enjoyed by other members of the community. The real nature of the various complications of tenure was in many cases not understood before the present settlement, and the explanations now given of them by the settlement officer ought to prove very useful in future in deciding cases regarding rights in land and water.

The Settlement officer has given an interesting account of the independent tribes beyond the frontier, and of the Powindah carriers. These, it may be remembered, joined in the Mahsud Waziri attack on Tonk, in January 1879, of which much has been written already.

With regard to assessment, it has been decided to apply one that is partly fixed and partly fluctuating,* and the rates at which these have been proposed, are considered light. The total assessment demand is given at Rs. 83,000 ; of this sum 22,000 represents the fixed demand, and Rs. 61,000 the fluctuating demand. The actual average collection's during the years, since settlement, have been Rs. 12,000 and Rs. 8,200 ; but this decrease was due to the seasons of 1876-77 having been unfavourable.

The total Government area in *rakhs* is 1,261 square miles. Grazing land has been assessed lightly, but over this land the proprietors have full control, as regards the grazing of kine, sheep and goats.

The assessment on date groves has been increased from Rs. 4,050 to Rs. 6,104, which gives an average of one anna per fruit bearing tree.

* The entire revenue according to the former assessment was estimated at Rs. 4,74,045, while under the new assessment, it is put down at Rs. 5,61,795, being an increase of Rs. 87,750, or 18 per cent. But this increase cannot be regarded as actual. It seems that Mr. Tucker under-estimated the amount of the grain collection by Rs. 16,743, and the *rakh* and *tirni* receipts by Rs. 2,950, while he overestimated the assessment of the Daman lands by Rs. 10,992, and of the kachi by Rs. 26,151 ; so that taking together the under-estimated sum, Rs. 19,693, and the over estimated sum, Rs. 37,143, and subtracting the former from the latter, the increase of revenue obtained by the new assessment must be reduced by Rs. 17,450, which will leave the actual increase in the assessment at Rs. 60,309, or about 12½ per cent. Of this sum, it appears that nearly Rs. 20,000 have been devoted to inams, to zaildars and other leading men, and Rs. 12,000 have been granted to jagirdars in compensation for losses caused by the abolition of their collections in kind ; while Rs. 22,000 have been alienated in providing jagirs for two Nawabs. Therefore the actual increase of revenue amounts in round numbers to a little over Rs. 6,000. No alterations have been made in the dates for the payment of the instalments of revenue.

The amount of revenue enjoyed by private persons and Government servants in 1878, was Rs. 1,91,293. The greater portion of the jagirs are enjoyed by the Multani Pathans of Dera Ismail Khan. The settlement officer recommended that the settlement be confirmed for a period of 30 years, but in view of the fact that the fluctuating assessments are undeniably light, that the district may possibly be connected by railway with the rest of the province before long, and that it is under contemplation to organise a series of inundation canals from the Indus, from Mozuffurgurh up to Kalabagh, it was not considered desirable to sanction the settlement for the period of 30 years ; and sanction has, therefore, been accorded for 20 years, with effect from the date when the new assessment of the district was completely introduced.

On the whole, it appears that Mr. Tucker had a very difficult and complicated task to perform, which he has carried out to the entire satisfaction of the Lieutenant-Governor of the Punjab. We agree with Sir Charles Aitchison in regretting that the great length of the report was not somewhat curtailed. It is seldom borne in mind that the only excuse for a lengthy official report is the interesting matter which it may chance to contain ; and even the absence of interest may be compensated for to some degree by the *style* of writing the report. It is not our wish to "pick-holes" in Mr. Tucker's very exhaustive report, but we could not help noticing some passages that might have been better written. For instance at page 7, para 14, the following passage occurs :—"The irrigating channels are full, and every one fills his *bunds* as fast as he can, and then closes their mouths." Another at page 8, para. 16 :—" The ground is generally more or less overgrown with different sorts of *lana*, which is much grazed by camels." The word " grazed," is peculiarly used. At page 9, para. 18, the following vague passage occurs : —" Here and there, as in the Sheru *ilaqua*, where irrigation is unusually certain, and the country is all cultivated, the villages lie close together in the middle of their fields." There is no noun to which the pronoun " their" could apply. We have just selected these passages at random to show that there is room for improvement. Mr. Tucker has shewn his ability in settling and preparing a record of the multifarious rights in the Dehra Ismail Khan District, and something better than this class of English might have been expected from him.

INDIAN TRADE WITH AUSTRALIA.

INDIAN trade with Australia has hitherto not been developed to any appreciable extent. Efforts have, from time to time, been made to open up a trade for certain kinds of Indian produce in the Australian markets, and *vice versa*, but with indifferent success. In 1883, this question appears to have been taken up somewhat energetically, but it was found that, in the trade with Australia, there had always been a very large excess of exports to Australia over imports from that colony, and that the increase in exports, however satisfactory, was not likely to assist in leading to the increase in direct shipping communication with Australia, unless some return trade was thoroughly established. It was pretty well known that Australia did not send much to India, except in the shape of horses and metals ; and it was considered doubtful whether there was anything else the Colony could afford to send to India in any quantity, except perhaps timber and *ghee*. The high price of labour in Australia precluded competition in India in any manufactured article, or any production in which human labour was an important element. Wool was not yet in demand, while frozen meat and preserved fruits, it was thought, would only meet with a small demand from the European population, and perhaps a small section of the native community. Timber, on the other hand, might be taken for public works, but the whole native population was a customer for *ghee*. The quantity of this article consumed in British India, exclusive of the Native States, has been estimated at considerably over five million cwts. per annum, the value of which may be set down at 14 millions sterling. Moreover, the price of *ghee* is gradually rising, owing to the continuous decrease of grazing land, and the greater profits derived from the cultivation of produce. Therefore, the import of *ghee* from Australia, if once introduced, would meet a constantly rising market, and become more and more profitable, and it was considered desirable to open, if possible, an extensive trade in this commodity.

With this object in view, the Government of India, in April 1883, decided on attempting the manufacture of ghee in South Australia, and asked the Colonial Government whether the experiment could be undertaken in the neighbourhood of Port Darwin. At the same time the desirability of importing buffalo-cows into the northern tracts of Australia was suggested as a matter worthy the consideration of the colonial authorities ; and as an incentive, an offer was made to present the Government of South Australia with three or four buffalo-cows, and one bull of good breed for the purposes of the experiment.

The offer was accepted, and in August 1883, three *ghee*-makers and one bull, and three cow-buffaloes left Calcutta for Port Darwin, where they arrived in September. The bull had died, and two more bulls were sent in his place in charge of two *ghee*-makers in February. During the time that the men were in the colony, they were engaged solely in the manufacture of *ghee*. The result of the experiment showed that the climate is suitable for buffaloes, and the stock were well when the last report was received. The cows had also given birth to healthy calves.

The *ghee* manufactured was excellent, and obtained a gold medal at the Calcutta Exhibition, where it was highly reported upon by experts and the military authorities. Mr. H. J. Scott, Commissioner for South Australia at the Exhibition, reported thus on the samples exhibited :—

" Near the close of the Exhibition, I received a case from the Resident at the Northern Territory, containing twelve jars of *ghee*, manufactured by Hindus, from buffaloes presented by the Government of India. As it was long past the allotted time for receiving exhibits, I made formal application, and received permission from the Executive Committee to enter it for competition. It being a question of caste prejudice whether the natives would eat it, I forwarded, through Lieutenant-Colonel Cologan, six jars to the Colonel Commanding the native troops in Fort William, and have since received and handed to the Minister controlling the Northern Territory an authoritative opinion as to its quality, in which it is stated the natives liked it very well ; that that it was refined too much, or, as they expressed it, " too good" for the market. The bazaar price varies from one to one and-a-half rupee per seer—that is 10*d.* to 1*s.* 3*d.* per lb., according to season. I gave one jar to Dr. George Watt, Economic Museum ; one to the Baboo in charge, and others to the Government Analyst, for examination. They each presented separate reports, giving it a high position and awarding the first order of merit, gold medal to the Government of South Australia. The teeming population of India use *ghee* for every-day use with their food ; their daily wants are enormous. Something like 300,000 tons of this clarified butter are annually consumed by the natives, and it is to this product we must look to open up a reciprocal trade when our horses are shipped from Port Darwin."

Owing, however, to the small scale on which the experiment was tried, the cost of the *ghee* was necessarily high, and as observed by the Colonial Government, it is impossible from the data at present available, to say whether a trade in *ghee* can profitably be established with Australia.

It may, perhaps, be explained here that, at the time of the Melbourne Exhibition (1880-81), a note was circulated in Australia by Mr. E. C. Buck, at that time Director of Agriculture and Commerce in the North-Western Provinces and Oudh, and appointed President of the Committee for India at the Melbourne Exhibition, which had for its object the encouragement of *ghee* manufacture in Australia, and explained at length the method of manufacturing this article in India. It was insisted that, for the exported article to take with the natives, it was absolutely necessary to imitate the Indian article as closely as it was possible to do so. In this connection, it may be noted that the verdict pronounced upon the *ghee* exhibited at the Calcutta Exhibition that it was " too good," may be taken as an indication of the native estimate as to the quality of the *ghee* that is likely to meet with a ready market in India. The verdict bears out Mr. Buck's opinion that, for the Australian *ghee* to succeed in India, no attempt should be made to deviate in any way—even for presumed improvement—from the appearance of the manufactured article as brought into the market by natives themselves. We are not in a position to say whether any further attempts have been made in the direction of exporting Indian buffaloes to South Australia since the last shipment was made ; but certain it is that, if there is to be *any* reciprocity in trade between India and Australia, to any large extent, our economists must hit off something outside of *ghee*, the manufacture of which by the Australians has not met with that measure of success which was anticipated from it.

Miscellaneous Items.

THE population of the North-Western Provinces and Oudh was increased in April by the birth of 136,954 children.

WE understand that Government contemplate doing away with appointments of Forest Settlement officers, in view to effecting a saving to meet the war-preparation expenses.

WE learn that two members of the Bengal Civil Service intend shortly taking two years' furlough each, in order to pass that time at Cirencester, as out-students of the Royal College of Agriculture.

GOOD rain fell along the Malabar Coast, between Goa and Cochin, on Sunday, last week, averaging about two inches all down the line, and a little has spread over the Central Provinces ; but Bombay and Bengal are as yet without rain.

DURING the month of April the total deaths from all causes were 96,169 in the United Provinces, N.-W.-P. and Oudh, compared with 82,841 in the previous month, and 150,046 in April of last year. As usual, fevers of kinds are responsible for the majority of the month's mortality, 74,136 having succumbed to such causes.

THE rules framed under the Punjab Municipal Act of 1884, for the appointment of Municipal Committees in the Province, have received the final sanction of the Lieutenant-Governor. They differ in the slightest degree from the draft rules published in March last ; very few complications having been added, and nothing in the way of simplification.

ON reconsideration of the subject, the Government of Madras is of opinion that it would be better to forego all duty on salt used for curing fish, having regard to the advantages to the public which will accrue therefrom. The present system of supply at cost price will be continued, and it will be the object of the department to suggest measures for extending the benefits of the system.

IT has been decided that the existing gauge of the Bellary section, of the Madras Railway, shall be undisturbed, as Sir Frederick Roberts, who has consented to the removal of the Arsenal from Trimulgherry to Bellary, as suggested by the Director-General of Ordnance and approved by Government, considers that, consequently, it is of paramount importance that the gauge of the line from Madras to Bellary should be unbroken.

THE French local Government has succeeded in affording sufficient relief to the ryots of Pondicherry and Karrikal, who suffered from the late inundations, to enable them to carry on the cultivation of their lands without the loss of any crop. The loans are repayable in five years by instalments, plus a small charge for interest ; but the Director of the Interior has full powers to grant extension of time, and also to make remissions in certain cases.

FROM the Railway Administation Report we see that the works on the Cawnpore-Kalpi line are well in hand, and, with the exception of the bridge over the Jumna, are expected to be completed about January next. The bridge at Kalpi will consist of ten spans, each of 250 feet. Seven out of the ten wells have been sunk to depths varying from 50 feet below low-water level, and if funds are available the bridge may possibly be finished by the middle of 1887.

As a step towards improving the live stock of the country, by the influence of example, the Director of Revenue Settlement and Agriculture recently proposed to encourage land-owners and Mofussil stock traders, by substituting presentations of live and dead stock for the money prizes which it is now the custom to distribute at Agricultural Exhibitions. These proposals had the concurrence of the Board of Revenue, and have now received the entire approval of the Government.

Two French steamers have sailed, from Pondicherry for Marseilles direct, during the last week : *The General*, Captain Escarras, with 15,000 bags, and the *Panama*, Captain Favard, with 29,000 bags of ground-nuts. There is no vessel loading at present, but four steamers have been chartered to load during the next four weeks ; these will take about 150,000 bags, which will clear off the greater part of present stocks, and as arrivals continue to decrease, the season's business may be expected to close some time next month. The total figures are expected to fully reach the original estimate of half-a million bags, which is 250,000 bags less than last year. Prices have been fluctuating, and a few days ago Rs. 21 were touched—quotations were Rs. 20 to Rs. 20-8, per French Candy.

MR. A. M. MARKHAM supplies the following to the Allahabad paper :—"Sir,—As I have recently seen it tried with marked success, I think it right to call attention to the fact that the root of *Achyranthes Aspera* affords almost instantaneous relief from the pain caused by the sting of a scorpion. The plant is very common everywhere, and is one of those whose clinging burrs are such a nuisance on one's legs when out shooting. It is called *chirchirra* by the natives of these provinces. The root macerated in water is applied to the part stung, and a small quantity is drunk in water. If this be done quickly, there is absolutely no pain half-an-hour or so after the sting, instead of the 12 to 24 hours of intense suffering which follow an untreated sting. Three cases occurred recently in my camp, in which the sufferers, thanks to *chirchirra* and the presence of a khitmutgar who knew how to apply it, were going about their work within an hour in each case, feeling nothing more than a numbness in the part stung. I am aware that this is no new remedy, but its value cannot be too widely known."

ONE more sign of the times was the meeting again last week of the Executive Committee of the Bombay Exhibition. Twelve months is none too long a period for completing the necessary preparations, if the undertaking is to be made worthy of India and Bombay enterprise ; but if an interval of two months were always to elapse between meetings, the year would slip by, long before arrangements could be perfected. The committee were, however, not to blame. Russia is the culprit. With war rumours thickening in the air, it would have been ridiculous to push on an enterprise which war would have rendered fruitless. Now, however, that the political atmosphere smells less of gunpowder, the Committee promise a renewal of vigorous action. At last week's meeting a considerable amount of solid business was disposed of. The Government offer of the parade-ground as a site was gratefully accepted, and the prayer of Mr. Nanabhai Jeejeebhai for the admission of press reporters to committee meetings was ruthlessly rejected. A cautious reply was returned to Government in the matter of purchasing the second-hand Indian exhibits from London at cost-price ; and the constitution of sub-committees and other departmental arrangements proceeded with. The date of the next meeting was fixed for such time as the Chairman thought matters were "ripe" for it, which ought not to be long in this sunny weather. The rains, too, are approaching, when it is not easy for the most energetic committee to prevent the grass growing under their feet.

Selections.

REVENUE DEPARTMENT.

FAMINE.

DARJEELING, THE 11TH JUNE, 1885,

RESOLUTION.

READ—

A letter, with enclosures, from the Commissioner of the Presidency Division, dated the 26th May 1885, reporting the result of local enquires made by the Collector of Moorshedabad as to the condition of the people in Khargram, in the Moorshedabad district.

ON the 18th of May the Lieutenant Governor received a telegram purporting to emanate from the Special Reporter of the *Bangabasi* newspaper, in which it was stated that 31 deaths had occurred from starvation in the village of Khargram, in the district of Moorshedabad, and that, if help was not speedily given, one-fourth of the population of the place would die in a fortnight. This statement was reproduced in the *Statesman* news-paper of the 20th idem, and was made the text of [illegible] hostile criticism. The information took the Lieutenant-Governor by surprise ; for, although the condition of certain distressed tracts in the Burdwan Division had been the subject of frequent correspondence, no report, official or otherwise, had reached him to suggest the likelihood of any mortality through want of food in Moorshedabad.

2. On the date of the receipt of the information, the Commissioner of the Division and the Collector of the District were directed to institute the closest enquiry into the facts. The results of that enquiry are now published for general information as an appendix to this Resolution. A house-to-house investigation, supported by an exhaustive record of evidence, shows not only that not a single death from starvation has occurred in Khargram, but that owing to the dryness of the season and the consequent decrease of malarious fever, the death-rate of the place has been considerably less than usual. The papers further show the great improbability that any deaths from starvation should occur there, as the local authorities, in accordance with the arrangements indicated by the Lieutenant-Governor, in his Resolution of the 18th November last, were fully alive to the necessity of affording relief to all who were in need of it. The condition of the tract in which Khargram is situated, and which has suffered to some extent from a succession of bad harvests, has been carefully watched by the district officers. The locality was visited in December by the late Collector, Mr. Farrer. It was again visited in February, by the present Collector, Mr. Anderson. No need for charitable relief has been apparent, and the applicants for employment on relief works, which are available, are few. But the enquiries of the Collector, and the information supplied by local residents and officials, go further than merely proving that the communication made to the Lieutenant-Governor, by the correspondent of the *Bungabasi*, was unfounded. They place beyond doubt the fact that the correspondent referred to, made no effort whatever to verify the intelligence he thought fit to communicate to Government, while they furnish strong reasons for believing that he had been deceived by interested parties, who were only anxious that Government money should be spent among them.

3. In connection with the distress which unhappily prevails in certain localities in Central Bengal. Sir Rivers Thompson has always welcomed, and has been ready to act upon, authentic information conveyed to him by those having local experience. On more than one occasion he has acknowledged the assistance which Government has received from independent quarters, in dealing with the pressure from which the people are suffering. It must, however, be obvious that when false reports, which when traced to their origin, are found to emanate from unworthy motives, are made the means of occupying the time of public officers, in harassing and useless investigations, the public interests must suffer. A responsibility thus rests upon those who are forward to give currency to fictitious and unverified reports.

By order of the Lieutenant-Governor of Bengal,

A. P. MACDONNELL,
Secretary to the Government of Bengal.

CINCHONA GROWING IN JAVA.

THE officers in charge of Government plantations in the Dutch East Indies do not wait until the middle of 1885 before issuing their reports for 1883, as does the Director of Kew, nor do they ever let a whole year ago by, as in the case of most of our Colonial Botanical establishments, but regularly every quarter full particulars of the work in progress are sent to the Executive Government, and at once published in the local papers. Thus we have now before us the report of Mr. Van Romunde, Director of the Government Cinchona enterprise, for the quarter ending December 31st last, and we quote below some passages which will be of interest to growers in our own tropical possessions. The gathering of bark was, so far as the weather permitted, carried on uninterruptedly. As in the previous quarter, so also in this, pretty large quantities of Ledgeriana slivers were gathered. Important experiments were made with the scraping of Ledgerianas and officinalis, which deserve mention. As has already been noticed, the middle and the end of the east monsoon are the best periods for showing off the bark In order to dispense with covering, the trees were shaved over only half their circumference, so that, for example, one year the south half, the next the north half is subjected to the operation. The question was raised, however, whether the trees might not yield two crops of bark in one year, without covering, by means of scraping. The experiment was made on a large scale, and the result has so far fully answered expectations under the following conditions:—(1) That a thorough working of the soil accompany the repeated shaving; (2) that between the two croppings a period of at least 2½ months elapse. If both conditions be not carried out, the trees suffer especially after the second operation, to such an extent that they soon assume a sickly appearance. The question has now to be solved, whether the trees will be able to bear the repeated operation, as well as whether the composition of the renewed bark warrants the above-mentioned method of harvesting. The graft plantations of known, analysed trees at Tirtasari ought, during 1885, to yield the necessary material for chemical investigations. The crop of 1884 comprised about 330,000 Amst. pound. Of this by December 31st, 314,387lb. had been despatched to Batavia, whilst 2,263lb. were reserved for the local military medical service. On 15th October the second half of the product of the crop of 1883 was sold by public auction at Amsterdam. The prices obtained were considerably less than those fetched at the sale of 19th July. The highest price was paid for a lot of Ledgeriana slivers, which fetched as high as ƒ2·19 per half kilogram. The lowest price was given for dust of C. Josephiana which bark realized only ƒ0·05 to ƒ0·32 per half kilo. As the harvesting of this most inferior bark no longer pays cost of packing and dispatch, the product of young branches and twigs will in future not be gathered. Good prices were paid for Officinalis barks. These varied from ƒ1·76 per half kilo, for root bark, to ƒ0·85 for dust. The nett result of the sale was about ƒ145,000) with an average price of ƒ·69 per half kilo. A beginning was made in November with the planting out, which work is, so far as the weather permits, being carried on uninterruptedly. The plentiful rains, after the severe drought in the last monsoon, had a favourable influence on the growth of the plantations, whilst the plants in the nurseries also developed vigorously, and will yield a good supply for planting in the first quarter of 1885. Shortly after the setting in of the rains the *Helopeltis Antonii* again appeared in full force, especially at Tjinjiroean and Tirtasari. By a timely catching and killing of the insects the damage done was very small. The sale of Cinchona seed at three auctions held during the quarter brought in ƒ4,770, whilst at two sales of grafts 300 of these were sold for ƒ3,600. By Government order No. 40. of 29th December, 1884, it was resolved that in future the Ledgeriana grafts and Cinchona need not be required for the Government enterprise, but should be sold by public auction without limit.—*Planters' Gazette.* (*English Paper.*)

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary General Meeting was held on Tuesday, the 2nd June, 1885. (Postponed from Wednesday, 26th May.)

COMMUNICATIONS.

MR. W. STIEFELHAGEN, of Boorancherra, Cachar, states he has lately discovered black pepper (Piper Nigrum) growing wild in the jungles, and offers to send plants, and later on, seeds, to the Society. The offer accepted with thanks.

From Mr. W. Claxton Peppe, Birdpore, Gorruckpore, who writes as follows:—"Last year, when in England, I searched for a *small* Rice-Husking Mill, but could find none but what required heavy machinary to drive it." He goes on to ask for further information regarding the rice husker, drawings of which are given in the Society's Journal for 1884, which was duly supplied.

From Mr. Manuol, Rangoon, asking for a small quantity of silkworm seed of the best Bengal variety of silkworm, he says: "I am desirous of attempting a cross between the Bengal and Native Burmah kinds, with a view to securing a better breed than we have at present. Our variety, the *Bombyx Arracanensis*, is a hardy poly-voltine, running through its cycle in from 40 to 45 days, but the silk is inferior and the cocoon is pointed," according to Wardle this variety was introduced from China, so there is every prospect of the experiment being attended with success. Mr. Manuel has been put into communication with Mr. Cleghorn, a member, who is devoting much attention to the subject of Indian Silk.

Mr. J. Anderson, C.S., writes from Berhampore in reference to silk. "I enclose a slip sent me by a silk planter of this district enquiring about the silkworm tree, and offering to take charge of any he could get." The following is the extract:

"Those interested in sericulture in India may be interested in the description of a tree found in Szchuen, which is used extensively as a source of food for silkworms. In the western parts of the province, Mr. Hosie, who went through Szchuen, in June and July of last year, reports a new tree which he thus describes:—

It stands from 10 to 15 feet in height, and resembles an overgrown tea tree. Its leaves, which spring alternate from the branches, are of a dark-green colour, smooth, ovate, acuminate, and not serrated. It is very extensively grown, and its leaves are used to feed the silkworm in their infancy. The local name is the *tsa* (*cho* in the north) *yeh* tree. It is apparently a species of thorns The peasantry insist that unless the young silkworms are fed with the chopped leaves of this tree, the output of silk will be less and of an inferior quality.

"It would be well if the new Bengal Agricultural Department interested itself to procure specimens or cuttings of the tree."

Dr. Macgowan, Corresponding Member of the Society in China, has been addressed on the subject.

From Captain Vyse, Station Staff Officer, Shajehanpore, asking for information and advice on the culture and treatment of Mango trees. He has been advised of the method lately found very satisfactory in England.

Messrs. Lahiri, Chatterjee & Co., of Calcutta, forwarding a sample of cotton which they say is disputed, and asking the Society's opinion as to the district in which it was produced. It was referred to Mr. M. V. Higgins, of Messrs. Haworth & Co., who kindly gave a Report. He identifies it as *Assam*, and considers it would command a good price in the Calcutta Market.

Bauhinia Vahlii.—From Captain Pogson, enclosing a letter to him from Mr. Smythies. Deputy Conservator of Forests, Dehra Doon, and forwarding a parcel of Bauhinia Vahlii seeds; Mr. Smythies says:—"This is one of the commonest climbers in India, and has a wide range, I should be glad if the natives would eat the seeds, pluck all the leaves, and cut down all the stems of this climber in our forests. We wage war against it, and have already cleared a considerable tract in Ramgarh of this weed. The stem is sometimes *five feet* in girth, and the leaves range up to 18 inches diameter.

We annually grant a large sum for the destruction of this climber and eventually shall exterminate it; but it will be a work of time. In the open forests, I am afraid, it will remain for ever."

Captain Pogson remarks that it is a pity such quantities of this superior fibre should not be utilized.

LEMONS IN INDIA.

Dr. Bonavia, of Etawah, writes in reference to this subject, as follows:—

"I wish to bring to the notice of your Society a most important tree, *viz.*, the *Malta lemon tree*, which I imported from the Mediterranean many years ago, for the Horticultural Garden of Lucknow. I lately sent four plants from here to Dr. King to ascertain how it would stand the moist climate of Bengal. I wish your Society would take it up also, and make some experiments to ascertain its value in that climate. The facility with which it can be propagated is simply marvellous. It stands the climate here with the greatest ease, and I believe would do everywhere in India, where oranges and lemons can be grown, Sylhet, Nagpore, Delhi, Nepal Valley, Kangra, &c. If we could obtain citric acid easily in India and cheaply, there is no reason why *Citrate of Iron and Quinine* could not be manufactured. It is the *next* important tonic to Quinine, and would be invaluable for picking up the strength of people recovering from fever. The commercial products of the lemon tree are many. Could you kindly help me in obtaining the statistics of imports into India through Calcutta, Bombay, and Madras, of the following commercial products of the lemon and the orange, *viz.*—

1. Citrate of iron and quinine.
2. Citrate of iron and ammonia; there are other citrate drugs, but I think these are the most important, but some of the Calcutta chemists may mention others.
3. Citric acid for pharmaceutical purposes, and for aerated waters, (tartaric and sulphuric acids are often used now for *lemonades*, because citric acid is dearer.)
4. Essential oil of lemons (of the rind) used in pharmacy, confectionery, and for flavoring lemonades. These lemonades are now so very important, as most of the army, railway employes, &c., &c., are becoming teetotalers.
5. Lemon drops and other confectionery where this essential oil and citric acid are used.
6. Candied lemon and orange peel.
7. Oil of neroli (essential oil of flowers of Citrus Bigaradia, and others. The C. Bigaradia, or Seville orange, grows here just as well) for confectionery, perfumery, pharmacy, &c.
8. *Petit grain* for scenting soaps and perfumery. This is the essential oil of the *leaves* of C. Bigaradia.
9. *Marmalade.*—Of this, there ought to be a great consumption in India in tins.

I have been experimenting with the *citrus lemonum vulgaris*, of *Riseo*, for nearly 25 years, and the more I see of it, the more highly I think of it as an industrial plant for India."

The statistics of the imports into Calcutta are not readily obtainable, and as the Custom House does not keep the details, it would seem hopeless to try to collect them from the many imports of articles in question, but such figures as can be obtained will be furnished to Dr. Bonavia.

RICHARD BLECHYNDEN, Junior,
Deputy Secretary.

THE COMPOSITION OF MILK.

(By Professor Sheldon.)

The production of milk in the mammary glands of female animals of the order mammalia, is at once one of the most involved, and curious, and valuable processes in the domain of organic nature. The conversion of grass, and hay, and grain, and roots, and such-like raw materials, into an exquisite fluid, which is extremely valuable to mankind, deserves to be universally understood and appreciated. That the milk from which we make cheese and butter comes from cows we all know, and we are equally familiar with the fact that it is primarily derived from the food which the cows eat; the *modus operandi*, however, is not generally apprehended, and it is worth while to make some inquiry into it, not for curiosity's sake only, but in order to promote greater respect for the cow as a servant of man, and greater care in the system under which she is managed. Charles Dickens said that if mankind were to return to the worship of animals, the cow would become the chief divinity; and in this he paid a noble compliment, not in the least undeserved, to the most valuable of domesticated quadrupeds.

The most advanced researches into the mammal glands of the cow have revealed a wonderful ramification of ligaments and tissues which, interlacing each other, support the udder in position, and admit of its distention and contraction. Within this structure blood-veins pass to and fro, and milk-ducts, cavities, glandules, lobules, and vesicles are distributed, forming together the organic substance of the udder. Here it is that the valuable constituents of milk are elaborated and blended. Within the cells and vesicles the fat of the animal, in itself comparatively colourless and tasteless, is thrown off by a process which may be termed 'budding,' and is at the same time transformed into the much more pleasing fat known as butter, in the form of globules whose dimensions are microscopical. These globules, or buds, or fatty pollen, as we may term them, when perfected, drop off into the cavities, in which they come in contact with, and are taken charge of, so to speak, by the water therein, which also contains casein and albumen that have transuded from the tissues of the animal's body; and they are carried along through duct after duct into the acini, or milk-cisterns, and the emulsion is finally extracted from the teats.

When milk is placed under a powerful microscope the cream-globules in it, like the lobules and vesicles in which they are formed, are seen to be irregular in size and form, some spherical, others oval; their form, however, is always rounded, having a rotund and not an angular exterior. This external evenness is due to the semi-liquid contents of the globules—I say 'contents,' because it is not yet finally demonstrated whether or not they are enclosed in an envelope of any kind, albuminous or caseous, or otherwise, or by serum condensed by attraction. The subtle process in nature's chemistry, by means of which the ordinary fat of the animal is changed into the peculiar combination of facts with which we are familiar as butter, and the means by which are obtained the no less singular odour and flavour of butter, both of which differ so much from anything else we know, are, and probably will remain, among the occult mysteries of nature. But it is evident enough that the milk glands are the seat of a wondrous activity to supply the countless myriads of infinitesimal cream-globules which are found in milk; and they are the no less wonderful theatre of mysterious chemical processes which produce the delicate flavour, aroma, and colour of butter. Countless, indeed, are the cream-globules in milk, for Fleischmann has calculated that a pound of milk, containing 4 per cent of butter, contains about 40,000 millions of them; and yet in fresh milk no two of them, as a rule, are so near together but that a third may pass between them.

It follows, then, that as these cream globules have actually been part and parcel of the system of the cow, they will consequently always harmonise with the nature, character, and condition of the animal by whom they are produced; and as cows differ considerably in the nature of their organisation, so will there be differences in the quality of the milk they yield. Cream-globules are composed of fatty matter, and fat is lighter than milk; hence they may be regarded as tiny balloons, which seek the position to which their specific gravity entitles them, and hence, too, the ascent of cream to the surface of milk which is at rest. Some of them, however, are so tiny, that the fat in them is too minute to float them to the surface, and these remain *in situ*, or even slowly sink. The better part of the cream it is that rises first to the surface, and it does so because, as water is about three per cent lighter than milk, so cream is about one-and-a-half per cent lighter than water, of which milk is chiefly composed. The largest globules rise first and fastest, the medium ones next, and so on; and so it is that the cream which rises in the first eight or ten hours will make finer butter than that which rises afterwards. It is from this first cream that the Americans make what they call 'gilt-edged' butter, which commands a fancy price in some of the cities of the Union; and they employ Jersey cows as a rule, because the average size of the cream-globules in Jersey milk is greater than in the milk of any other breed of cows.

The milk of cows, as of all other mammalia, consists of water, butter, casein, albumen, milk sugar, and mineral substances. The following is its average percentage:—

Water	87·25	per cent.
Butter	3·50	"
Casein	3·50	"
Albumen	0·40	"
Milk-sugar	4·60	"
Mineral substances	0·75	"
	100 000	

As will be seen in the following table of results obtained, the limits of variation in the composition of pure milk are considerable:—

Water	83·65 to 90·00	per cent.
Butter	1·80 to 5·20	"
Casein	3·00 to 5·00	"
Albumen	0·30 to 0·55	"
Milk-sugar	3·00 to 5·5)	"
Minerals	0·70 to 0·80	"

And it will be noticed that, with the exception of the water, the cream volume varies more than any other constituent of the milk; so that cows in low condition, unless they are being fed on food rich in fats—in which event they will not remain in condition which, for milk-giving purposes, may be accurately described as "low," though at the same time they may be carrying very little flesh—cannot be expected to give milk of rich quality. Herein is involved a set of considerations of much importance in the management of cows, and I commend it to dairy farmers.

The complicated and delicate composition of butter is seen in the following triglycerides of fatty acids—the component elements into which the chemists have resolved it:—

Butyric acid		Volatile fatty acid.
Caproic	"	
Caprylic	"	
Capric	"	
Myristinic	"	Real fatty acid solid.
Palmitic	"	
Stearic	"	
Butinic	"	
Oleic	"	

In combination with glycerine they become *butyrne*, for the first bracket embracing the fluid and the second the solids fats. The flavour, colour, and aroma of butter have their origin in the first classification; while the body of the butter—the animal fat—is chiefly demonstrable to the second.

The element in milk next in importance to the butter is the casein, or curd, which forms the solid body of cheese. It is composed of the following chemical elements, according to the late Dr. Voelker's analyses—

Carbon	53·57
Hydrogen	7·14
Nitrogen	15·41
Oxygen	22·03
Sulphur	1·11
Phosphorus	0·74
	100·00

Enough has now been said to demonstrate the highly-complicated character of milk, and its comprehensive nature as an article of food. It is, in fact, the only known single article of food which contains all the elements necessary to the maintenance of life for a lengthened time, and in the best chemical and mechanical combination. Enough too, has been said, I hope, to inculcate the principle of kindly and generous treatment of cows; and particularly so when it is borne in mind that, in the domestication of cows, we have placed them under conditions which are essentially artificial.—*North British Agriculturist.*

THE BEST COWS.

There is no point in issue between the breeders of dairy cattle about which there is such a diversity of opinion as that of judging the merits of milch cows. With horses the watch makes the criterion with runners, and trotters, while draft animals can be tested by the dead pull, and carriage or park horses need most to please the eye. With beef cattle the scales and handling generally give very good satisfaction, though the butcher's block should be the ultimate criterion. When, however, we come to cows in milk, to determine which is the best, there are so many innate or latent virtues and vices, it is hard indeed to tell which is the best in a herd without long and patient study, and even then they vary so in each year's performance, the decree of one season is often over-ruled by the experiences of another.

In the showing, of course, the examination upon which the judges must rely is of necessity the most superficial. To be sure, the cows can be milked, and the question as to which is the best when fresh, may be, with proper precautions against trickery, tolerably well determined, but after all the best cow is not the one that does the best immediately after calving, but, on the contrary, it is generally the one that does the best before calving. That is, the one that holds out best throughout the year, is the one that returns the greater profits to the owner. This is often proved by actual experiment to the utter amazement of the owner, especially the first season that the owner uses the scales. It is the old story of the tortoise and the hare.

Again, the question of quality of yield is of the greatest value only to the man who sells milk, while the butter-maker is more anxious about the cream. This point is difficult to determine on a short acquaintance with the cow. Practical science seems unable to solve the problem. Cream gauges and lactometers alike are misleading. Nothing but the churn seems to be able to settle the question outside of elaborate and expensive analysis. Having tried all the modern appliances for cheap and expeditious tests, we are inclined to think the mouth the best judge after all. With care and considerable practice most people can tell rich milk when they taste it, though there are many ways to deceive the tongue. Milk that has stood long enough for the cream to rise, and is then thoroughly mixed again, will taste much richer than it would when first drawn from the cow. This is probably owing to the lumpiness of the cream, which takes hold on the organs of taste more readily.

The men who have probably had the greatest trouble and accomplished the least in the matter of testing or judging are those who manage the various cattle clubs.—*American Dairyman.*

RULES FOR BUTTER MAKING.

The best churn is the one that will agitate most without pounding, at the same time creating a free current of air in the churn.

2. The cream should not be churned into a mass of butter, but the churning should cease when the butter gathers into small particles, say the size of apple-seed, so that the buttermilk can easily be separated from the fats by washing.

3. The butter should be thoroughly washed, and pure water or brine should be used. Working lowers the flavour and injures the keeping qualities.

4. Where cream is setting, the surface should not be exposed to an atmosphere much warmer than the cream.

5. The greatest percentage of cream can be got from milk that undergoes the greatest variation of temperature. Milk set at 90 degrees and lowered to 60 will produce about the same quantity of cream as milk set at 70 degrees and lowered to 40, the variation in both cases being the same; but the former will produce better flavored butter. Farmers should therefore set their milk as warm as possible and let it cool to 50 or 55 degrees, afterwards not allowing the temperature of the cream or butter to vary much from these figures.

6. When farmers use the skim milk for feeding stock, the advantages of the system of separating the highest possible percentage of cream from the milk is greatly over-estimated.

7. More butter can be obtained from churning the milk than from any other system except the centrifugal.

8. A much larger percentage of cream can be obtained from newly calved than from old calved cows.

9. The number of pounds of milk required for a pound of butter varies from 20 to 30 according to the richness of the milk and the system of separation of the cream.

10. "Heavy milk" is a term applied to milk the cream of which rises slowly, leaving no distinct line of demarcation between the milk and the cream. Such cream is very thin. Heavy milk is produced by one or more of the following three causes: (1) In some breeds, such as the Ayrshire, the fat globules are small and specifically heavy, so that they either rise more slowly or not at all, and many rise only partially; (2.) In all breeds milk becomes heavier as the milking period is prolonged, especially when the cow is in calf; (3) All milks tend to become heavy when allowed to cool before setting.

11. If set at the same temperature, say 80 to 85 degrees, milk set in ice will produce 10 to 15 per cent more butter than when cooled with water to 50 degrees Fahrenheit.

12. By centrifugal seperation about 12 per cent more butter can be produced than by cooling to near freezing point by ice, and about 30 per cent more than by cooling to 50 degrees with water.

13. Butter, if removed from the churn, without working, while in small granules, can be preserved fresh and sweet in brine almost indefinitely.—*The Farmer's Advocate.*

THE FORMS OF LEAVES.

At an April meeting of the Linnean Society, Sir John Lubbock enlarged on some points he had dwelt on in a popular manner in his lecture at the Royal Institution. He said he had long been puzzled at the reason why some plants have cordate leaves, more or less elongated, others palmate. Starting from a foliaceous expansion of a stem, the former was evidently the the simpler type. He had suggested that the cordate shape was the earlier, from which the palmate was developed. The interesting consequence would follow, that if in the same genus some species were cordate and others palmate, the latter were of later origin. This explanation pre-supposed that the palmate forms, at any rate under certain circumstances, presented greater advantages. Sir John suggested that this might have reference to the power of self-support and of resisting wind. The weight of the leaf and the force of the wind might be considered as if they were concentrated on the central point of the leaf. Now in palmate leaves the centre would be nearer the point of support, and the resistance to any given force, therefore, would be more effectual. This point was illustreated by experiment. Broad leaves, however, were of two main types—ordate with veins following the curvature of the edge; and palmate or lobed leaves, with veins running directed to the margin. Now, the fibres constituting the so-called veins of leaves, contained elongated cells running parallel to the veins. Consequently the sap passing up the leaf stalk, and into the leaves, moved more readily along these fibro-vascular bundles, having fewer cell walls to traverse. It was almost like going along a road instead of across country. The fibro-vascular bundles then acted as pipes conveying the sap, and it is clearly more economical that they should go straight to their destination, rather than wind in a curve. As the sap passes more freely along the veins, the leaf also grows there more rapidly, which seems to explain the common-lobed form of leaf, with a wing to the point of each lobe.

Referring to some criticism on his views with reference to the relation between the size of leaves and the diameter of the stem, Sir John examined especially those of the conifers. Thus the spruce fir had shorter leaves than the Scotch fir, but they remained on much longer—say seven or eight years instead of two or three, and had a stem as thick or thicker. Amongst other interesting problems presented by leaves, he discussed the probable reason for the larch having deciduous leaves, and for the presence of two kinds of leaves on certain cypresses and other trees.—*Forestry.*

PRESENT LOW PRICES AND THEIR CAUSES.

The question of price is, of course, a complicated one, because many things may operate to affect the price of any given article, or of articles generally. You may have fluctuations of supply and variations of demand affecting the articles themselves, and arising merely out of commercial causes.

But you may have changes arising from political events, which may affect supply and demand, not only of articles bought and sold, but also of the money in which price is calculated. Thus, for instance, it can hardly be doubted that the last Franco-German War caused an extraordinary demand for gold, and forced on the market an unusual supply of Silver, which had a marked effect on its value in Europe. Other causes inherent in the business of mining affect the supply and demand of gold and silver, as the discovery of new mines or the working-out of old ones, or the increased cost of working mines, and thus prices must be affected by the supply and demand of the precious metals.

But the state of credit also affects prices seriously. A rapid creat [illegible] aper money without a due security in bullion may have a powerful influence, and so may credit in other forms. A state of speculation may cause great demand for various articles, and a state of panic and alarm may force excessive supplies on the markets. Thus it is clear that any analysis of a rise or fall in prices is far from easy, and can probably at the best be only approximate and tentative, however careful may be the endeavour to give due relative weight to he various agencies which affect the transactions of mankind.

In January 1879, Mr. Giffen read before the Statistical Society a remarkable paper as to the then condition of prices. He pointed out how general and how important had been the fall which had then taken place, and he ventured on a prophecy of a continued and increased depression, giving also a statement of causes, including amongst them a comparative scarcity of gold, which he considered was an ascertained fact. Six years have passed, and recent phenomena as to prices are so curious and important that I have ventured to think that many readers, even of this Review, may be interested by a consideration of those events and their probable causes.

A comparison in figures of the prices as given in his tables, and of the prices of the same articles six years later, will bring before the reader the present situation more impressively than any other mode of statement. It will suffice to give the most important articles of commerce.

Table of prices in January 1879, and in January 1885, of several principal articles.

	1879.	Jan. 1884.	Jan. 1885.
Coffee, per cwt. (Ceylon)	65*s.*	70*s.*	57*s.* 6*d.*
Cotton, per lb. ...	5⅜*d.*	5½*d.*	6⅛*d.*
Coals, per ton. ...	19*s.*	17*s.*	17*s.* 6*d.*
Copper (Chili), per ton	57*l.*	58*l.*	48*l.*
Iron (Scotch pig), per ton	43*s.*	43*s.*	42*s.* 3*d.*
Lead	14*l.* 10*s.*	14*l.*	11*l.*
Tin	65*l.*	90*l.*	75*l.*
Butter, per cwt. ...	116*s.* to 120*s.*	130*s.* to 138*s.*	124*s.* to 128*s.*
Beef (prime), per 8 lb.	4*s.* 9*d.*	5*s.* 2*d.*	5*s.*
Cheese	60*s.* to 62*s.*	62*s.* to 64*s.*	58*s.* to 60*s.*
Wheat, per qr. ...	39*s.* 7*d.*	39*s.*	32*s.* 6*d.*
Silk, per lb. ...	15*s.*	15*s.*	13*s.*
Sugar, per cwt. (W. India)	17*s.* to 20*s.*	16*s.* to 19*s.*	9*s.* 6*d.* to 12*s.*
Wool ...	Sydney fleece, 1*s.* 7*d.* per lb.	1*s.* 5*d.*	1*s.* 4*d.*
Tallow (Australian) ...	38*s.* per ton.	41*s.*	32*s.*

There is not here a general fall, and the serious fall did not arise until the year 1884.

It seems to be impossible to understand the causes of the present fall, without a consideration of other similar changes which have occurred in years long past. Fluctuations during the past century have been very remarkable, and we had several serious falls of price, which lasted through considerable periods, even before any great changes in the supply of the precious metals had occurred.

Some of us can recollect the depression of 1849, and the dread which soon after that arose lest the discoveries of gold should so alter the value of the standard that all holders of fixed incomes would be ruined. We have lived certainly to see an advance of prices and a great extension of trade consequent on the discoveries of gold; but we have also lived to see the advance followed by an equally important depression, so that we now stand very much where we were before California and Australia had opened up their treasures.

Gold has appreciated, inasmuch as £1 sterling will buy more of other things than it would have done in 1873, but the question is, how has this come about ?

The problem before us seems to be, how far the present situation is due to an increased demand for gold, causing a scarcity of the standard metal; and how far to an excessive, or, rather, unusual, supply of the articles we buy and sell, causing sellers to accept prices which would a few years since have been regarded as absurd. Possibly both causes may be at work at the same moment. The supply of gold from the mines has certainly fallen off, and the demand for it has, in some ways materially increased. On the other hand, the "visible supplies" of the principal articles of consumption may be so enormous that we need seek for no other causes of depression in prices. Producers must sell or cease to produce, and cessation of production often costs far more than a temporary reduction of price; because, if production ceases, the capital used must find new employment—a change which involves heavy losses and great inconvenience, if not ruin. So we often see a continued production on most unprofitable terms.[1]

One of the most remarkable peculiarities of recent changes has been the rapidity of the fall of prices in many cases. For instance, the price of wheat was about 40*s.* a quarter in October 1883, but it fell to 30*s.* in November 1884.

This result is due to actual and expected sup- plies, as no one doubts. It is not suggested that there is any other cause.[2]

The price of West India refining sugar fell from 18*s.* to 10*s.* between 1883 and 1884, of Java sugar from 23*s.* to 13*s.* 9*d.*, and of beetroot from 18*s.* to 10*s.*, in the same period. The stock at the end of the year had increased 39,022 tons between 1882 and 1884, and last year we received from Germany 7⅜ millions cwts. of unrefined sugar, against 4⅜ million cwts. in 1882.[3] In this state of things, a great fall of price is to be expected.

Take another case: that of tin. It has fallen, since May 1883, from £96 to £75 per ton. Lead has had a somewhat similar history. Copper has fallen to a point lower than ever before known, in the face of a demand which is said to have just about doubled in twenty years, but supplies from the Cape, from Spain, and from America have exceeded all expectations.

The fall in iron and coal from the enormous prices of 1872-73 is only to be accounted for by an extraordinary production, so that even a large demand could not dispose of it effectually. The production of pig-iron in the world is said by Messrs. Fallows to have been—

In 1868	...	...	...	9,392,000	tons.
,, 1872	...	...	...	13,906,000	,,
,, 1879	...	...	...	13,768,000	,,
,, 1883	...	...	...	20,410,000	,,

Our stock has increased more than 4⅓ times since 1874. No one can be surprised at a fall in such a condition of the market.[4]

It is worth noticing that the same thing has happened in the small articles of bark and shellac, which have fallen 50 per cent in a very short space of time.

Such changes cannot be attributed to any movements in the supply of gold or silver. The result are too rapid, and perhaps too large, for the suggested cause. Nor is this rapidity of change a fact of only recent occurrence. We have seen it on several previous occasions. Take the folowing cases, which I extract from the very interesting posthumous work of Professor Jevons, all of them occurring before the great discoveries of gold of the present century. From 1789 to 1849 we find the following results at intervals of ten years :—

Year.	Average ratio of prices to prices of the year 1849.
1789	133
1799	202
1809	245
1819	175
1829	124
1839	144
1849	100

Here we see an enormous rise between 1789 and 1809, and an even greater fall from 1809 to 1849.[5]

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[1] In some books on political economy the removal of capital from one employment to another is spoken of lightly, as if it were an easy process. No delusion can be greater. Such changes can, of course, be made in some kinds of business without very serious loss. A banker, whose fixed plant consists of a few chairs and tables, may, if he has been prudent, wind up his affairs and invest his capital elsewhere; but a manufacturer or farmer, with money sunk in all sorts of ways, cannot sell his plant without heavy loss, except in very peculiar times and under extraordinary circumstances. The times when he could so sell are prosperous times, when he would not desire to abandon his occupation and find another. The times when he wishes to retire would be the very times when others besides himself are suffering from reduced profits, and when few would be disposed to enter on such a business. So, if he sells, he must sell at a great sacrifice in order to tempt a purchaser. Rather than do this, he will continue his business, even at the risk of working at no profit, or at a loss.

[2] It is stated in the *Times* of January 19th, 1885, that wheat has not been so low for upwards of a century. In 1780, the annual average price was the same as in 1884—viz., 35*s.* 8*d.* But the population was probably about one-third of its present number.

[3] The following figures are interesting (see *British Trade Journal*, Jan. 1885 :—

World's Production of Sugar.

	Cane Sugar. Tons.	Beetroot. Tons.	Total Tons.
1852	... 1,044,542	... 153,000	... 1,197,542
1879	... 3,487,045	... 1,393,939	... 4,880,984
1880	... 3,554,000	... 1,742,992	... 5,296,992
1882	... 3,605,301	2,059,419	... 5,664,720
1883	... 3,759,000	... 2,225,000	5,984,000

[4] It is a curious and interesting fact, as showing how great recent changes have been, that Mr. Jevons, writing in 1863, says that metals are subject only "to very slow and occasional variations of supply" ("Investigations," &c., p. 47). No one would say that now. Who would now speak of the supply of the metals as "a supply incapable of great increase"? It has been proved to be just the contrary in the cases of iron, copper, tin, and lead, at any rate.

[5] As an instance of a rapid fluctuation occurring under very different circumstances to those of the present time, I extract the following from Tooke's "History of Prices," vol. i, p. 235 :—

	1798-99.	1800-1.
Coffee, per cwt.	... 185*s.* to 196*s.*	... 116*s.* to 130*s.*
Sugar, East India	... 96*s.* to 115*s.*	... 50*s.* to 70*s.*
Cotton, per lb	... 3*s.* 6*d* to 4*s.* 6*d.*	1*s.* 5*d* to 2*s.* 3*d.*
Cinnamon	... 8*s.* to 10*s.*	4*s.* to 5*s.*
Tobacco	... 11½*d.* to 16*d.*	... 4*d.* to 5*d.*

Whatever the changes may now be, the course of commerce has certainly given us much more steady prices.

Subsequent to 1849 the effect of the gold discoveries began to be felt, so that the average ratio of 1859 was 120, and of 1869, 119.

But the interesting point for our present inquiry is the consideration of the changes which preceded these discoveries. In his tract, "The Variation of Prices," published in the *Statistical Journal* for June 1865, Mr. Jevons expresses great doubt as to the cause of the very high prices of the early part of the century, and of the fall which followed so rapidly after 1809. He seems to think that the gold and silver, from whatever causes, were very redundant early in the century, and that thence arose a rise of prices here which caused a large drain of gold and silver to the East, and thus the previous advance of prices was turned into a decided fall; but he admits that the drain of gold and silver is greatest from 1814 till 1820—that is to say, after the fall prices had already begun. It is not easy to trace any very clear relation in this matter, and after balancing various considerations—as discovery, and increased yield of mines in Russia and Spanish America; the long-continued wars; the displacement of metallic by paper currency; the restriction of trade; the hoarding of currency and dispersion of it by armies in the field—he winds up saying, "I assert the redundancy of gold in the early part of the century as a simple *fact of observation.*"

In note C to his paper on the value of gold ("Investigations," &c., p. 110), Mr. Jevons attributes the fall in prices after 1820 to the want of increased supplies of the precious metals at a time when "modes of procuring, raising, and making other articles more easily and cheaply were constantly being discovered." And he argues that this fall must have continued but for the discoveries of gold. So the discoveries both checked a fall and caused a rise.—*Contemporary Review.*

NOTES ON TEA.

By Percy Swinburne, *late of Sylhet and Cachar.*

The Cost of Opening Out.—Tea gardens in India depend: 1st, on the price of labour; 2nd, on the way the work is done; 3rd, on the nature of the forest or jungle which has to be cleared. But the price of labour is the all-important point.

In unhealthy places it is necessary to import Jungly coolies, as these are the only people who do not entirely succumb to the climate. The importation of Jungly coolies under a three-years' agreement costs from Rs. 80 to Rs. 100 per head, this being equal to about Rs. 30 per coolie per annum. Although these coolies are less liable to suffer from fever and bowel complaints than the others, they may still fall ill in great numbers when a new, unhealthy garden is opened out. For the first two years two coolies would barely do the work of one; and, calculating houses, medicines, and sick allowances, an unhealthy garden would cost Rs. 100 per acre extra for labour alone to bring it up to paying point. Then there is the unfortunate manager to be sent on a sea-trip, and, last, but one of the most important items, the small amount of work done for the daily wage must be considered, as if the coolies are not coaxed and petted they run away. In case of an unhealthy garden, situated in a place where no labour could be obtained, about Rs. 200 extra per acre should be estimated for as capital account, or total cost of opening out, up to time at which the garden clears its own expenses. But it has been already shown that if 6 maunds an acre can be safely estimated, Rs. 500 to Rs. 600 an acre capital would leave room for a profit of about 10 per cent.

In most parts of Assam and the Dooars, the North-West Provinces coolies and the Madrassies are almost unknown, and a thin, pale Dessoalin is sometimes seen as the sole survivor of a challan. But in Cachar and Sylhet the bulk of the coolies are North-Westers. In Darjeeling there is abundance of Nepaulese labour. The Jungly coolies are small, dark, and generally handsome, and though they are addicted to getting drunk and quarrelling on leave days, they are generally very tractable, natty and nice in their work, and are capable very frequently of building their own houses. The women are excellent pluckers.

The North-Wester varies much, according to the district from which he comes and the *Jat* to which he belongs. Most of them come from the country about Benares, and are steady, hard-working, excellent hoeing men. The women as a rule are very clumsy and do no kind of work well. Their fingers, as the natives say, are "like toes," and very few of these become good leaf pluckers. They are a very thrifty people, and nearly starve themselves to save money. Their great ambition is to own a cow, and it is a good thing to encourage them in this.

The Madrassie is the most intelligent of all the coolies. He is as good at the hoe as at work in which more skill is required, and he makes an excellent hand in a tea-house, taking an interest in his work; and an Oriental who does this is indeed a *rara avis.* The women are equally good with the men, and not only pluck well, but work hard.

The local labour in Assam consists of hill people, called by various names—Arkars, Nagas and Kookies, and the Mishree, a people of the plain. These work generally only for a short time. Kacharies who come down in batches from their own country, offer their services to the highest bidder. The Kacharies are the most important of these labourers; they are very clannish, and it requires considerable tact to get good work from them. Tall, pale, stalwart, but sneaking, mean and cowardly, they invariably try to get an unfair advantage from their numbers and co-operation; but those planters who know their language and work with these people speak well of them.

In Cachar and Sylhet there are also the Busteewallahs or villagers, Hindoo and Mohammedan, who at some seasons of the year will come to work in the gardens in large numbers. They are chiefly useful for building, cutting and clearing jungle, and planting, weeding, &c., as the Hindoos will not hoe and Mohammedans are comparatively scarce. The pay to the Busteewallah is 4 annas a day for hoeing and 3 annas a day for other work. The coolies are paid by task work, but the rate of pay is generally as fixed in the Act (1882) Agreement, viz., Rs. 5 for men and Rs. 4 for women per month. Although local labour is cheaper than imported, it is as a rule unsatisfactory, as when it is most required it is often unprocurable, and the Bengalee is a shuffling creature, from whom it is almost impossible to wring out good work.

Starting Operations.—The site having been chosen, the contracts for labour, jungle clearing, and house building should be made in September or October, as contractors have frequently an unhappy knack of delaying or forgetting their engagements, and it is very desirable to arrange with as many contractors as possible, giving each section of the work, for the same reason. The rates vary in different districts, but for light tree jungle with dense undergrowth, and for bamboo land, to be cut clear or burned, so that the ground is ready for hoeing, the rate is about Rs. 10 per acre; for heavy forest, the cost of clearing will be considerably more, and for sungrass and light jungle less. Not a single tree should be left, and the land should be cleared about the end of November.

The sungrass for thatching should, after being cut, be stacked widely apart, in order to avoid the risk of fire. The lines should be placed near a river, stream, or tank, where the coolies can wash freely. A good height to make them is about 18 *hats* (that about 1½ foot) long by 16 *hats* broad. In Ceylon, where labour is much dearer than in India, roofing tiles cost Rs. 7 a thousand. About 9 to 10 tiles go to the *square* foot, and about half that number of bundles of sungrass cover the same area. With sungrass at Rs. 20 a thousand, thatched lines would be almost as dear as tiled ones, an allowance being made for the extra strength of roofing required for tiles. In Sylhet, four-sided roof (charchalie) houses are built for 10 annas a hat, so that an 18 hat house would cost Rs. 11-4, all material provided except sungrass. Sungrass costs from Rs. 10 to Rs. 30 a thousand bundles, each bundle to be of the thickness the two hands can span, thumb and finger touching.

In a house 10 hats broad, each hat takes 100 bundles of sungrass. This is thin thatching, but it is enough to keep out the rain; it should, however, be increased each year. A good allowance of room is 6 hats by 10 hats for two coolies, and if the 18 hat house is divided into three commpartments, it accomodates six coolies comfortably. Taking the average cost of sungrass at Rs. 10 per thousand bundle, one hundred, covering 1 hat of house, cost Re. 1, and the building and material for 1 hat would cost 10 annas; total, Rs. 1-10 per hat. If the sungrass were at Rs. 5 per thousand bundles, the total would be Rs. 1-2 per hat. One coolie occupies three hats, and it consequently costs Rs. 4-14 or Rs. 3-6 to house him. The builders, especially contractors, require strict supervision, as it is necessary that real cane, and not split bamboo, should be used; and the posts should be let into the ground to the extent of one quarter of their height, and the Kali bamboos, which form the framework, should be pucca, well seasoned, if possible, in water. If bamboo posts are used, they should be "barooah," and the arrah and turrucks "macarh" and "jaice." The houses should be in a line with a road between them, and not less than 40 hats or 20 yards apart, to prevent the risk of all being burnt in case of fire. The arrangement also allows room for a kitchen garden round each house, as well as space for the cattle at milking and feeding time, in the evening and morning when they are not herded on the grazing ground. Machans should be fitted where the coolies wish, in their houses, and they should on no account be allowed to sleep on the ground.

Tea Seed.—It is still undecided which is the best kind of seed—indigenous, hybrid, or China. Gardens of China plant, especially in Darjeeling, sometimes realize the highest prices in the market for their tea, and it is asserted that the China plant gives the finest flavour, but the hybrid the greater strength. There can be no doubt that all teas, whether indigenous, hybrid, or China, develop a peculiar flavour of their own when cultivated on high elevations, and this flavour is considered by many Darjeeling planters to be most pronounced and more readily developed in the China plant. Soils, too, affect the flavour and certain soils suit certain kinds of plants; but the broad fact remains, which is better known to tasters than to planters themselves, that a certain fine quality and delicate flavour can be traced in the tea of indigenous gardens in all districts. This is the more significant, as every factory has a different system of manufacture; and if all were to manufacture it exactly the same way, the difference between the varieties of plants would be more marked. Next, the yield per acre of fine Assam, hybrid, or healthy indigenous is generally admitted to be greater than that of the China plant, although some assert that as much tea can be made off an acre of inferior hybrid as from any other kind of plant. The price of indigenous tea is found in the hills of Munipoor and Hill Tipperah, and doubtless, if search were to be made, it could be found in other hill districts. A litele of this was found scattered over Cachar and Sylhet growing wild. Next in order comes the Assam indigenous, then the fine Assam hybrid, then the hybrid, then China. In buying seed, it is advisable to begin negotiations early in the year, to prevent disappointment, and it is better to pay a little more to buy seed from an estate which is well-known to give pure seed—that is, seed unmixed with inferior jats—than to take the chance of careless plucking. A guarantee is usually given as to condition, but seldom as to quality, which is more important. The history or pedigree of the seed should be given, as, for instance, if the seed is to be brought from C. garden, it should be described as (say) Assam indigenous, or Munipoor indigenous, from A. garden to B. garden to C. garden, the seed being traced to its untransplanted parent. The seed generally deteriorates with each remove, but it would not do so if the plant were well treated and perfectly healthy, and if the indigenous tea were always kept separate from the hybrid, so that the pollen from the flower of the one could not be carried to

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A WEEKLY

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VOL. X.] CALCUTTA :—SATURDAY, JULY 4, 1885.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING JUNE 24, 1885.]

General Remarks.—Good rain is again reported from Madras, where agricultural prospects are generally fair, and have improved in the districts in which they were most unsatisfactory. Harvesting is in progress in a few districts. In Mysore and Coorg rain has been general: the crops are in fair condition in Mysore, and promise well in Coorg.

In some districts of the Bombay Presidency, good rain has fallen, but in most places it has been insufficient for sowings. *Kharif* preparations are in progress in twelve districts.

Rain has fallen in the Berars, Hyderabad, and in most parts of the Central India and Rajpootana States. Cotton sowing is in progress in the Berars; and *kharif* and *abi* ploughings have commenced in Hyderabad. More rain is required for the crops in parts of Central India and Rajpootana. Slight rain is reported from the southern half of the Punjab: *kharif* ploughing and sowing are in active progress. In the North-Western Provinces and Oudh, slight rain has fallen in most districts: ploughing operations have commenced. In the Central Provinces, there has been good rain in most districts.

More or less rain has fallen throughout Bengal in sufficient quantities for present agricultural needs. More rain is, however, wanted in parts of Behar. Standing crops are growing well, and sowing of *amun* paddy is in full progress. In Tipperah considerable damage is said to have been done to the crops by floods; and in Dacca also some damage is apprehended on lowlands. The continuance of wet weather in Assam has proved injurious to the crops in Kamroop and Sylhet; but more rain is wanted for tea in Dibrugurh. Ploughing and sowing operations continue. In British Burmah the weather is seasonable, and ploughing is in progress.

The public health is generally fair in most Provinces.

Prices are still high in Bengal, and are fluctuating in the Punjab; elsewhere they are generally stationary.

Madras.—General prospects fair; slightly improved in Bellary and Anantapore.

Bombay.—Good rain in some districts, but insufficient for sowing in most places. Deficiency of water in the canals in parts of Sind. Preparations for *kharif* crops continue in parts of twelve districts. Scarcity of drinking-water in one taluka of Dharwar, and of fodder in three talukas of Dharwar and two of Ahmednugger. Cholera in parts of eighteen, small-pox in parts of eleven, and fever and cattle-disease in parts of eight districts.

Bengal.—More or less rain throughout the province during the week; it is generally reported to be sufficient for all present agricultural purposes, except in parts of Behar where the fall has been slight. *Aus* paddy, jute, sugarcane, and other standing crops are now growing here, and the cultivation and sowing of *amun* paddy are in full progress. In Behar cultivation of *bhadoi* crops has commenced, but more rain is much needed in some places. In Tipperah considerable damage is said to have been done to the crops by floods, and in Dacca also some damage in lowlands is apprehended owing to sudden rise of water. Cholera is still prevalent in some districts, and fever in Rajshahye and the Chittagong Hill Tracts, otherwise the public health is generally spoken of as pretty fair.

N.-W. Provinces and Oudh.—Light rain pretty general. Ploughing operations commencing. Weather generally cooler, though still very hot in some places. Markets well stocked. Prices nearly stationary. Slight cholera continues in some districts, and has increased in Ballia. General health and condition of cattle good.

Punjab.—Slight rain in the southern half of the province. Health generally good. *Kharif* operations progressing. Prices fluctuating.

Central Provinces.—Rain plentiful, except in Nimar; and sowings are progressing. Cholera severe in Raipore and Bilaspore. Prices rising in Nimar, elsewhere steady.

British Burmah.—Cholera and small-pox in several districts, but not severe; cattle-disease in some districts, severe in Amherst and Bassein, but slight elsewhere. Ploughing progressing. Rainfall seasonable.

Assam.—Incessant rain has done some injury to some standing crops in parts of the district. Rivers falling. Cattle-disease not yet disappeared; public health good.

Mysore and Coorg.—Season favourable for preparing the land for transplanting paddy, good rain having fallen. Slight fall in prices of food-grains. Prospects of season and public health good.

Berar and Hyderabad.—Cotton sowings almost completed. Wheat 22 and *juari* 26 seers per rupee. Weather warm and sultry.

Central India States.—Weather seasonable. Health good. Prices steady.

Rajpootana.—Tanks and wells not low. Health good. Prices low. Weather cool; light clouds; high winds.

Nepal.—Weather still hot. Cholera increasing in the town. More rain wanted for the recently sown rice.

Letters to the Editor.

TESTS FOR TIMBER.

TO THE EDITOR.

SIR,—Referring to the queries of your correspondent, A TIMBER MERCHANT, which appeared in your issue of the 27th instant, I beg to submit the following answers:—

First query—By what method timber merchants or builders may ascertain at what season any timber (now lying in their respective yards) was felled in the forest? Answer—If the timber is felled in summer, the starch granules would form superabundantly; because in trees the organic elements of nutrition, in the shape of starch granules, form during summer, and are stored away in the cells of the pith and of the woody cylinder, for use in the winter and in early spring, before the new leaves have acquired the strength necessary for the performance of their functions. This can be easily tested by a simple solution of iodine.

Second query—What is the method of testing starch in any log? Answer—A solution of iodine is the only *recipe*. But I don't know whether our timber experts, or conservators of forests, can recommend any better method.

Third query—How should we detect wood that was felled while the sap was in flow? Answer—Timber felled while the sap was in flow is of the worst kind. Experienced builders seldom use this sort of wood in building, because it decays very soon. To detect this kind of wood, a solution of iodine should also be used.

In short, if your correspondent wishes to know more on this subject, and will apply to me personally at my residence, I shall be glad to explain matters to him more fully.

HEM CHUNDRA DUTTA.

Rughoo Nath Chatterjee's-street,
Malakar's Cottage, June 29, 1885.

THE JUTE INDUSTRY.

TO THE EDITOR.

SIR,—It is some time since a discussion on the Jute trade appeared in your valuable columns, and I would ask leave to renew the subject, with perhaps a degree of success, as regards its final issue. The prosperous times which were foretold by some of your correspondents have failed to make their appearance, and at present the horizon is still dark, and the clouds even blacker than before. Can some influential Jute-wallah not stir himself up, and push the matter, which, I think, is now all that is necessary? There are rumours regarding various companies which must be taken at their worth; but how much are these rumours worth? I am afraid that there is more truth in them than the agents care to acknowledge, and really some effort ought to be made at combination. It is true that some agents, who have their shareholders' pockets in view, have declared that they will stop so soon as their stock of Jute runs down, and others have decided to run short time. These individual moves are not to be regretted, as they, no doubt, will help to reduce the evil of over-production, and enable the manufacturer to get a better price for his bag; but who will reap the benefit? Certainly not those on "short time" or "off" altogether, but those who are content to run, at present losing money, in the hope that they will derive the advantage of the better market at their neighbours' expense. But can these agents not have the foresight to perceive that, when individual Mills find they can manufacture at a profit, they will immediately start work, and flood the market as before? And I question very much whether the temporary rise will cover the losses of the running mills, for so soon as the Mills off work, and on short time, resume their full working power, the values will recede to their old low level. Can combination not be arrived at, or are the shareholders of the various concerns content to see their money thrown to the dogs; to see their plant sold in a cheap market; to retire gracefully from the field of competition, their pockets so much the lighter, with the grim satisfaction of having kept at least one firm alive by a liberal allowance of Commission?

COSMOPOLITE.

Calcutta, June 24, 1885.

Editorial Notes.

The quantity of new season's tea exported from China and Japan to Great Britain, from the commencement of the season to the 4th of June last was 12,713,592lbs., as compared with 19,860,524lbs. exported during the corresponding period of last year.

⁂

The amount of Indian sea and land customs revenue, exclusive of the salt revenue, for the first two months of the current financial year, has amounted to Rs. 21,22,000, as compared with Rs. 20,57,000 during the corresponding period of last year.

⁂

The Secretary of State for India has approved the action of the Madras Government in directing the closing of the works for the manufacture, on the excise principle, of salt in the district of South Canara. The reasons given for this action are, that the arrangments having been in force for upwards of seven years, a sufficient time has elapsed to give the scheme a fair trial, therefore it was nothing but right to abandon the effort to introduce the system into a district for which it is apparently unsuited.

⁂

It is stated that the Bombay exhibits sent to the Antwerp International Exhibition formed a very interesting collection. The Bombay Court appears to have been in a very forward state of preparation on the opening day, the 2nd ultimo, and was honoured by a visit from their Royal Highnesses the King and Queen of the Belgians, the Count and Countess of Flanders, and their son, Prince Banduin, the heir-apparent to the throne. Their Majesties expressed themselves much gratified with the beauty of the articles exhibited, and promised to pay a longer visit on a future occasion.

⁂

Our readers may remember that a short time back we referred to a proposal said to have been under consideration, which had for its object the transfer of Forests from the Home Department to that of the Revenue and Agricultural Department. We now understand that this proposal has come to nothing. A local contemporary very correctly remarks:—"It would be interesting to know how this has been effected. The anomaly of the present arrangement is notorious, and the marvel is that it has lived so long. One would have thought that the Home Department would have been glad to get rid of what it must regard as an extraneous encumbrance." We should have thought so too.

⁂

A correspondent from Colombo, sends the following telegram to a local contemporary, under date the 20th June, and to which we invite the special attention of our Tea merchants:—"The Melbourne Tea Market is firm for all Indian kinds, but great complaints are made as to the unfavourable out-turn of breaks, as compared with the sample packages. There is sometimes a difference of from two to four pence between the value of the breaks and the sample, causing great loss of prestige to Indian tea. Confidence in the reliability of the sample packages is thus lost. Strict attention is needed to this matter; also smaller packages are required. All China tea comes in half-chest boxes, which are less liable to breakage and handier to transport."

⁂

The late rains have improved the indigo prospects in Bengal, and manufacture has commenced in one or two factories. Good rain has fallen in the Midnapore district, and prospects are generally fair. Seasonable rain has also fallen in Tirhoot and Chumparun, though a further fall would still be acceptable in some places. *Mahai* has commenced in a few factories, but will not be general till about the 5th or 6th of next month. Very little rain has fallen in Chupra, and the season will probably be late and the outturn deficient. Good rain has fallen in Shahabad, enabling the planters to commence their sowings; and rain has also fallen in the Benares provinces, where it was much wanted. There is, however, but little news from the North-West, though it is said that the area under cultivation both there and in Benares is less than last year.

⁂

The gold trade of Melbourne has been reviving of late, as we find that the export of this metal from Melbourne during the month of May of this year amounted in value to £788,747, which is the largest amount on record for many months past But this is counterbalanced by a still larger quantity being imported, thus making a decided drag on the trade, as imports are on the increase and exports are going down perceptibly. The increase in the value of imports during May was much larger than that of the corresponding month last year, exceeding it by £73,089; while the value of the merchandise exported compared unfavourably with that of last year during the same period, it having decreased by £96,692. The greater portion of this decrease is ascribed to diminished shipments of breadstuffs and agricultural produce generally.

⁂

Mr. Bosworth Smith, the newly-appointed Government Mineralogist at Madras, has been inspecting the mineral collection in the Museum at the city. He does not think that it is a perfect index to the natural wealth of the Presidency. He considers the iron specimens best, the copper specimens he only considers interesting from a scientific point of view, but that they are too few in number to be of much value. He is reported to have expressed much surprise at the few specimens of lead collected in the Museum, considering the many deposits of this metal that occur in the presidency. He has suggested sections of the many fine marbles and limestones, as well as the igneous rocks used for building purposes, should be studied microscopically in order to test their durability, and that the collection of standard minerals from foreign countries require re-arrangement, and, in some instances, to be re-named, as the wrong names had been given.

⁂

The pre-eminence of England as a coal-producing country would seem to be likely to be overthrown in the near future by one of her own children. The New South Wales coal-fields have been surveyed and discovered to be of enormous extent. For hundreds of miles along the coast the seams of coal can be traced, and it has already been worked at different altitudes from 450 to 1,500 feet above the level of the sea. Altogether coal has been found to exist over 25,000 square miles of country; while England's annual output of 120,000,000 tons is derived from a total coal area of 4,000 square miles. More than this, the lower strata of New South Wales coal date from a more distant geological epoch than any that have been worked in Europe, and the coal therefore is of unrivalled excellence. In addition to these enormous advantages the mining industry of New South Wales will owe much of its future prosperity to the fact that the coal fields are everywhere situated within easy reach of water and railway communication, and that an abundance of iron ore, limestone, and fire-clay are found in immediate juxtaposition to the seams of coal. Altogether it would seem impossible to exaggerate the prospects of the New South Wales collieries.

The Report on the Meteorology of India in 1883, which has been courteously placed at our disposal by the Meteorological Department, is a very complete record of observations taken all over India, and is of peculiar interest. To the student of meteorology, it will present an endless variety of data for speculation, as it is only from the collation of meteorological readings that we can hope for any accurate understanding of the climatic influences of a country. In this respect the present report is exhaustive. We notice one new feature in the report, *viz.*, the record of the duration of bright sunshine by means of a sunshine recorder. This instrument has hitherto been used only at Calcutta and Allahabad, and for a month or two at Jeypore. It is of some importance to have a measurement of the duration of bright sunshine, as it is a more direct measure of the amount of solar heat of the earth's surface, than the register of its mean maximum intensity. The instrument is ingeniously contrived, and promises to supersede the sun-thermometer. The report contains interesting charts shewing the mean distribution of the temperature, atmospheric pressure, and the direction of the wind, with charts of the rainfall, and the changes preceding, accompanying, and terminating two rainy periods, and cognate subjects.

⁂

The Government of India, in the Home Department, have addressed a Circular letter to all local Governments and Administrations, enquiring, with reference to paragraph 83 of the Forest Department Code (2nd Edition), whether any particular form has been adopted for the record of rights and privileges admitted in the several Reserved Forests, or whether it is left to the Forest Settlement officer to record such rights and privileges in whatever form he chooses. If the former procedure has been followed, it is requested that the Government of India may be favored with a specimen copy of the form adopted. The point that gave rise to this Circular, was a statement containing a record of the rights, admitted by the Forest Settlement officer, on behalf of Government, in the Annamalai reserve, Coimbatore district, Madras Presidency; and it is considered that it would be an advantage, if similarly complete records of rights in reserved forests were readily available for purposes of reference, in connection with every such forest in the several provinces. That the work of control is much facilitated when the forest officers can refer to some such clear statement as that drawn up in Madras, instead of having to refer to a confused mass of vernacular records of settlement, as has to be done in some provinces.

⁂

The *Pioneer* says:—After having had occasion to remark lately, that the notices of ejectment in Oudh for the approaching revenue year had reached the monstrous number of over 85,000, we turned with some interest to the Revenue Administration Report of the Province, just issued, to see in what light the question would have struck the Government. The report covers the year ended on the 30th September last, and touches a number of small questions of the most slender interest. But the one subject of real importance, Oudh tenant-right, is dealt with and disposed of in a single brief paragraph. "The Lieutenant-Governer and Chief Commissioner does not take up any close examination of the statistics............it is sufficient to say that the figures in the report strengthen his belief that the Oudh rent law, in regard to tenant holdings at-will, might be amended with advantage to the tenantry and without real detriment to the interests of the landlords." No one will be disposed to question this conclusion any more than the following:—"The steady increase of ejectments indicates a practical insecurity of holdings, and a constant shifting that can be hardly otherwise than economically disadvantageous;" and we may well believe that among the tenants who had formerly rights of their own in the land, "the uncertainty and instability of their year-by-year occupation must, if it continues, *as it probably will*, keep up a feeling of discouragement and discontent." But the hungry sheep will not be fed with the bare enunciation of perfectly obvious truths. If the Government, while admitting all these evils, hints also that they are within reach of remedy, it is surely bound to do something more. It is said that the question is "under consideration," and indeed it would be singular if it were not; but consideration is not the means for meeting increasing evils which are yearly growing more difficult of remedy. Is it the intention of the Local Government, after all its inquiries, and the facts which they have established, to sit still and consider until the old yeomanry of Oudh have passed into the condition of the Behar ryot? It would almost seem that it is.

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The following is a summary of Messrs. William James and Henry Thompson's fortnightly circular of Indian Tea, dated Thursday evening, 4th June, 1885:—"Since the 21st May 9,000 packages have been catalogued for sale, including 105 packages of new tea, 2,480 packages from Ceylon, and 1,300 packages of re-printed and second-hand tea. The quiet tone still prevailing in the country has been reflected in the market, and the auctions have passed without animation; prices, however, have been fully maintained for all good teas, but have inclined to favour buyers of common qualities, especially of Broken Tea and Fannings. About 100 packages of new season's growth were sold on the 1st instant, at fair prices considering the indifferent quality of the tea; the quotations ranged from 8*d.* to 1*s.* 3½*d.* per lb. The second sale was held in Calcutta on the 28th May, and about 5,500 packages were sold at an average of 10¾ annas; we are advised that the quality was good, and prices were steady. At the corresponding sale last year, 3,500 packages were sold at an average of 7 annas 10. Shipments of 1885 crop are rather in advance of last year. The deliveries during May were 4,214,000lbs., and the stock in the Bonded Warehouses is reduced to 14¼ million lb.—7¼ millions less than last year. We estimate, however, that about 2½ millions over the average were cleared in consequence of the duty scare, which makes the real deficiency 4¾ million lbs. The trade has not yet shown any apprehension of scarcity, and many hold that, as in other produce markets, it will be found possible to conduct the business without the heavy stocks which used formerly to be carried. This must be borne in mind in calculating the effect upon the market of this unusual depletion of stock. The proportion of Indian and Ceylon Tea consumed in the United Kingdom during the past 12 months has risen to 40 per cent, as against 35 per cent in 1883-84, and 33 per cent in 1882-83."

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The Madras Missionary Conference have taken occasion to submit a memorial to the Governor of Madras, in which they have taken exception to certain recommendations of the committee appointed to report on Abkari administration. The sentence that has been particularly objected to, occurs in Mr. R. A. Dalzell's second report, and runs as follows:—"The excise revenue has more than doubled itself during the past sixteen years, and may, I believe, if carefully developed and regulated, so as to bring about some sort of uniformity of excise duty both on arrack and toddy, be moulded into an equally convenient engine of taxation, as the salt tax, being raised or depressed, in accordance with State necessities." (p. 10.) Much stress is laid on this "engine of taxation," which is to be "carefully developed." The Madras Government, however, distinctly repudiate, as forming any part of the policy of that Government, the design to convert the Abkari, or tax on liquor, into a "convenient engine of taxation." The Missionary Conference have made certain remedial suggestions, which have been taken up *seriatim* in a resolution by the Governor of Madras. The resolution winds up with the following:—His Excellency has to observe that the provisions of the Abkari Bill, which is now under the consideration of the Legislative Council, and may shortly be expected to become law, will amply provide for the preventive establishments necessary to prevent illicit practices in connection with the liquor trade.

No one will doubt that the cause taken up by these reverend gentlemen, *viz.*, the restriction of the liquor traffic, is a worthy one; but it seems to us that the liquor traffic can be best restricted by imposing a heavy tax on its manufacture, and this appears to be what the Government have in view by making the excise revenue a "convenient engine of taxation." Whatever be the terms of the Abkari Bill, the ultimate result of the memorial will have one good effect, *viz.*, it will go far to render the supervision of the liquor traffic stricter in the future than it has hitherto been, as seems evident from the Governor's resolution.

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The prospects of sugar-cane culture in the Madras Presidency are not encouraging. Mr. Benson, Agricultural Reporter, says that the recent fall in the value of sugar has caused severe loss to sugar growers in the district, and that a good many are giving up the industry. A good deal of the cane he saw was derived from rattoons, growers having been loth to incur the expense last year of planting sugar-cane fields. The extent of the losses may be gathered from the fact that a short time ago jaggery was worth Rs. 21 to 22, per candy of 500lbs., while at present it is only worth Rs. 14 to 16.

To the regular grower the cost of raising a crop of sugar-cane may be put down at from Rs. 90 to 100, and for a crop of rattoons, Rs. 70—80. The cost of making jaggery has to be added to this, and is somewhat as follows :—

	Rs.
For a first crop	60
For a rattoon crop	40

Thus making in all

	Rs.	Rs.
For a first crop	150	160
For second, or rattoon crop ...	110	120

which at present prices is unremunerative, except in so far as it affords the ryot a useful outlet for his labour. In fact, judging from Mr. Benson's report, the sugar industry is likely to die out in Madras. Another reason for the fall in prices may be found in the fact that Mr. Benson noticed that the jaggery made in the Godavery district was of an inferior quality, and compared unfavorably with that manufactured at Poona. It may be observed that at Poona very primitive methods were adopted, but Mr. Benson did not particularly observe the process followed, which secured the superior result, as he did not, at that time, know anything of the local jaggery manufacture. The correspondence contains no suggestions for improving the present depression in the sugar industry.

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A CONTEMPORARY makes the following very sensible remarks on the subject of cattle-breeding in Bengal, to which we would invite particular attention :—"The newly-appointed Agricultural Department of Bengal should take up the subject of cattle-breeding in right earnest. That bullocks and kine are deteriorating and disappearing very fast in Bengal, no one having the slightest knowledge of the state of things in the Mofussil will have the hardihood to deny. Milk and all its preparations have not only become dear but scarce. The decrease in the yield of milk has been gradual and constant, and this can only be accounted for by the supposition that the species have deteriorated, or their number has decreased. The *goalas* mournfully declare that both these evils are at the root of their misfortune, that now-a-days they can scarcely see the face of a healthy strong calf or a fat milch-cow, and that after an interval of 8 or 10 years, that fell scourge, the *basanta* carries away 99 per cent of their cattle, and ruins them within 4 or 5 days. This has been their representation since the last two decades. It was, we believe, in 1870, that the attention of the Government was directed to the fact of a fearful epidemic amongst the cattle of Bengal, and a Commission was appointed composed of a few Europeans, and one native gentleman. What they did, neither we, nor anybody else, we believe, know. One of these Commissioners, Dr. K. Macleod, obtained a reward of Rs. 500 from the Government for compiling a treatise on the native mode of treating cattle-diseases. But in spite of the Commission, Dr. Macleod, and his treatise, the number of cattle has not ceased to decrease nor the species to deteriorate. The subject is of vital importance to the nation, for cattle is our only wealth, and we die with our cattle.

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BENGAL cattle is weaker, leaner, and more sickly than the people of the country. One of the chief reasons for this state of things is want of fodder. Grasses for cattle are not cultivated here as is done now in other parts of the world. The people chiefly depend upon the straws which they even cannot collect properly, and a large portion is left in the fields for want of sufficient funds. This year the cultivators in most parts of Bengal have been able to gather very few straws on account of bad harvests, and the result will be the starvation of their cattle. The cows and bullocks in this country are thus fed simply to keep them in existence, and generally kept on half rations. On the other hand, they are made to work hard, a pair often doing all the business of a farmer having fifty biggas of arable land. Under these circumstances, the poor, hard-worked and famished cows and bullocks die of sheer exhaustion like our prisoners, and fall an easy prey to such diseases as the *basanta*, the *paschima*, the *titla*, &c. The Agricultural Department cannot do a better service to the country than by introducing such grasses as the guinea, the sorgo, the *jal Moora* amongst our cultivators. Cattle better fed and strengthened, the people will be in a better position to meet the multifarious demands of Government in the shape of taxes, rates, cesses, and duties. Another potent reason for the deterioration of the species is the disappearance of healthy, strong bulls from the country. And the Government and its insane officers are responsible for this mischief. In accordance with the injunctions of the *shastras*, a male calf is usually set at large during the funeral ceremony of elderly people. These calves immediately become common property, and they are treated with respect by the community. The charge of maintaining them was borne by the community, and, in course of time, these, simply by their mode of living, became strong, half wild, huge bulls. That the object of this injunction of the *shastras* was to improve the breed, we for one have not the least doubt. But where are these sacred bulls now? They are rarely to be seen in Bengal. In the rutting season, the ryots carry their cows from village to village in search of a bull, and if they find a hard-worked, lean, and half-famished one, they consider themselves fortunate. A healthy breed can never be expected from such a breed, and no amount of good feeding will improve a calf of such a parent. No wonder then that there should be an epidemic among cattle, and that the yield of milk should gradually decrease.

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WE extract the following paragraph from the letter of the Ootacamund correspondent of the *Statesman*, dated the 13th ultimo :—

"The unnecessary severity employed by the Government officials on the Nilgiris, in the collection of land revenue, has for some years been scandalous. Now that such severity has terminated fatally in one case, it is hoped Government may be inclined to look into the matter, and temper the misguided zeal of officials anxious to earn a reputation for efficiency. The Deputy Collector the other day issued a warrant of arrest against the person of a Canarese gardener, who had unfortunately fallen into arrears. The man was in bed, in a critical state, suffering from pneumonia. The process-server was remonstrated with when preparing to execute the warrant, by a gentleman who happened to be near at hand, and the man's friends guaranteed payment of the amount due. Notwithstanding these promises and assurances, a stretcher was procured, and the defaulter carried in a semi-nude condition through wind and rain to the Deputy Collector's office, and there allowed to be exposed to inclement weather. Finding the man *in extremis* he was hurried back—but the exertion and exposure were too much for him, and he died within half-an-hour of reaching his home. The process against the person of a defaulter can by law only be issued when his property is insufficient to liquidate the Government claim; or where the defaulter is wilfully withholding payment, or has been guilty of fraudulent conduct to evade payment. None of these circumstances are present in this case, which demands a searching enquiry at the hands of Government. I think that, even technically, the arrest cannot be justified."

If the facts are correctly reported, it is difficult to write calmly of an instance of such wanton disregard for human life. A searching enquiry should be instituted into the circumstances touching the death of the deceased.

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A CORRESPONDENT from Moorshedabad, under date the 22nd June, sends the following to the *Statesman* :—

"A gentleman in the district has been making experiments in fibres recently, and intends cultivating largely later on. He tells me that he has been very successful with the Hibiscus esculentus, or *dhenrus*, which he says yields a fine and strong fibre. I saw his plantation and was struck with the vigorous growth of the plants, attaining eighteen inches in height in the course of two weeks. It seems very easy of cultivation and does not require weeding, being strong enough when once it has appeared above ground to exclude all intruders, and growing faster than jute, with which the fibres compare very favourably in length and appearance. I gather that the preparation of this fibre is similar to that of jute, The following is the process, as explained to me by the planter referred to :—

The *dhenrus* being ripe, the stems are cut down close to the roots, made up into bundles and steeped in a neighbouring *jhil*, with bamboos and lumps of turf laid over them to keep them submerged. Here they are watched from day to day until the proper point of decomposition has been reached—which is ascertained by trying the bark with the nail. This being attained, a number of men stand up to their waist in the water, each taking up as many sticks as he can grasp, removes a small portion of the bark next the roots. Then, grasping them together he strips off the whole from end to end with a little dexterous management, without breaking either stem or fibres. Having prepared a certain quantity in this half state, he next proceeds to wash off. This is done by taking a large handful, swinging it round his head and dashing it repeatedly against the surface of the water, and drawing it through towards him so as to wash off the impurities. It is now wrung out to remove as much water as possible, and hung on lines in the sun to dry.

This was the process carried out last season, but I learn that a machine is to manipulate the fibre as soon as the plants are ready this year, and it will be interesting to know the result as a commercial enterprise. The grower has great hopes of the fibre proving superior to jute in color and strength. If this is the case, I have no doubt its cultivation will be a success pecuniarily, as it is as easily prepared as the latter, and costs less in cultivation.

The *Hibiscus Esculentus* is not new to us as a fibre-producing plant. The foregoing communication is interesting in so far as it concerns the easy cultivation, rapid growth, and small cost of growing the plant. Should it prove superior to jute in color and strength, it may replace that plant commercially.

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It will be remembered by our readers that not long ago a suggestion was made by the Director of Public Instruction, Madras, for the establishment of a school of Forestry in connection with the Agricultural College at Saidapet. Acting on this suggestion, the Government of Madras called for the opinions of the two Conservators of Forests—Major Campbell Walker and Mr. Gamble—on the scheme. These have now been received, and we find that both these officers are opposed to the proposal. Their arguments against it are based upon sound reasons, which are, that there would be very little chance of turning out efficient men from a school of this nature at Saidapet, which place is not suited for such a purpose. The Imperial Forest School at Dehra Doon is very highly spoken of by both officers, as affording a means of imparting the best theoretical knowledge, combined with practical lessons in forestry, and they see no reason why students from Madras should not be sent there, as they are from other parts of India. It is further stated that "the mere circumstances of travel, mixing with forest officers from other parts of India, and the healthy spirit of emulation engendered at the Dehra School, tend to open the men's minds, develope their powers of observation, and foster a feeling of self-respect and pride in their profession which cannot fail to do much good." In fact very strong arguments are used by both officers against the establishment of a Forestry School at Saidapet, and neither of them are prepared to give the measure any support. Mr. Gamble says that "If eventually a large increase of work, and the number of subordinates, make a Madras Forest School necessary, it is not at Saidapet that it should be instituted, but at some place like Coimbatore, where it would be close to the most important rests and plantations, both of the hills and the plains."

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It will interest our readers to know Major Walker's estimate of an ideal Forest Ranger. Here it is :—"Much practical experience, and intelligence and education of a high order, are necessary to make a good Ranger. Besides practical forestry in all its branches, he should be a good surveyor and draughtsman, be able to level and construct forest roads, bridges, timber slips and houses. This necessitates an acquaintance with higher mathematics, mensuration and trigonometry, besides which he should have mastered the elements of botany and physiology, and be intimate with the system of Land Tenures and the Revenue and Criminal Law, so far as it refers to forest matters not provided for in the Special Act, with which, and all departmental rules, he must, of course, be fully conversant. If we add to the above, energy and thorough trustworthiness, we shall have formed some idea of the ideal Forest Ranger." We sincerely hope Major Walker will realize his "ideal ;" but we have some doubts about it, especially when it is remembered that the brilliant prospects held out to this "ideal" are—a salary of between Rs. 50 and 125 per mensem !

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Mr. E. C. Buck, the Revenue and Agricultural Secretary to the Government of India, while in England recently, is reported to have made the following communication to a representative of the *Ironmonger*, on the subject of agricultural implements in India :—

"The story of agriculture in India is a long one, but that relating to agricultural machinery is a short one. I do not wish to say anything that may discourage manufacturers, or that may tend to drive them out of the field, but it will be as well to state at the outset that, under existing circumstances, there is, I believe, little chance of the natives of India taking to machinery in a general way for a long time to come, or if they do, at present it will only be to a very limited extent. This is not to be wondered at considering all things. First, there is the cheap and abundantly-supplied labor market, with wages at about 2d. per day, or 1s. per week. Compare this with the cost of labor and the yet not very extensive use of machinery in this country, and you will get some idea of the difficulty in the way of persuading the natives to adopt machinery. The only possible chance at present, I believe, is to supply them with machinery to do such work as cannot be done by hand, such, for example, as small sugar-crushing mills. For treating the sugar-cane the natives have always, of course, had a machine, but, though it was crudely constructed and very defective, it has involved fifteen or twenty years of patient work to bring a machine down to the requirements of the natives, making at the same time a really good machine, which when used once by the natives is sure to be appreciated. Then, not only this, but the prejudices or ideas of the different districts have had to be conquered, and the machine has had to be modified or adapted to the peculiarities of the district in which it has been introduced. Such mills the natives buy in tens of thousands. Now this proves, I think, better than anything I could personally state, that the natives will use a machine if it is brought down to them and adapted to their requirements. It is the greatest possible folly on the part of Europeans to suppose that any such thing as educating the natives up to Western machinery is to be accomplished at one stroke. I could mention firms, were it desirable to do so, who have sent out machinery with that object ; and the Government of India has also done its best to induce the natives to take and try the machines. Yet, no, not a vestige of success has attended the effort.

"But, as I said just now, I do not wish to throw cold water upon European energies. On the contrary, I would only endeavor to set the manufacturers right. It is utterly useless for any European firm to trust simply to agents or branch houses out there. The market has to be created, let it be remembered, and the only way of creating it is to go in and out among the natives, to travel through the country, and thus become thoroughly conversant with their manners and customs, and their prejudices, too. Then, if a machine can be produced which will save labor, and effect at the same time a reduction in the low cost of such labor, there will be a splendid opportunity for doing business with the natives. Let me illustrate this by referring again to the sugar-crushing mill. The old mill was mostly of stone and its operations were of the pestle and mortar kind. It was also very heavy, too heavy to be lifted or carried about from place to place with convenience ; and, moreover, it took two bullocks to work it. Now, the machine is light, and can be carried by two men and worked by one bullock.

"Now, take another thing. Here is a tool which is used by every native. (Here Mr. Buck produced a bill-hook.) It is not an elegant affair, nor is it used exactly the same in shape and size in all districts, as it varies somewhat, and is called by many different names, according to the district ; but it is a fair specimen of what is used in the district where I reside. You will see that it has a very short handle ; that is due to the fact that the natives, when at work, sit down, even when felling trees, and it will be very obvious that they could not work with a long-handled tool. With a view of seeing what could be done in this tool alone, I went to a firm of manufacturers, and asked them to make me some like it. Yes, they said, they could do so, and turn out a nice bright article, with a polished handle and a bright, sharp blade.

'No,' I replied, 'that is just what you must not do. If I were to take such a tool to them they would not only never use it, but they would be frightened at it. Make them as nearly like the pattern as you possibly can, dirty-looking and old, and at the lowest price, even if the profit is *only small*.' And that is what must be done in all cases. It is no use whatever to attempt a large profit at first; on the contrary, I should not be surprised if manufacturers made a loss for a while, and they should, I think, be prepared to make it, because the natives have no capital, and they will only make purchases of what they cannot well do without.

"The time may come, however, when better tools and implements will be required. The Government is doing all it can to educate the natives, and it is reasonable to suppose that when they understand these things better, there will be some interest taken and a desire evinced for better appliances. But I must add that these new and better tools must not be introduced by the Government. There are always, of course, a hundred failures to one success, and the native mind is not favorable to experiments. He is quite sure he knows his business better than anybody else, and resents anything like forced instruction.

"With regard to the planters, circumstances are, of course, quite different. As a rule they are men of capital and of some education. They know the value of machinery, and their oxen being altogether of a superior, stronger kind, they are able, supposing them to be willing, to use what the natives, because of their only half-fed and not very strong bulloks, are unable to use. Yet even with them the low price of labor acts as a deterrent in the employment of machinery, and at best the market is very limited and slow. The only part of India where labor-saving machinery has as yet been successfully introduced is in Burmah and in Assam, in which latter place they take reapers for jungle grasses, and mowers for the low grasses. But, as with the planters, the scope for European enterprise is not wide, and manufacturers will find it best to make a bid for the native market. What this market may become some day if properly worked may be judged from the fact that there are no less than than 40,000,000 of holders of land, each holding only five acres."

A FEW AGRICULTURAL IMPLEMENTS FOR INDIA.

(By Sayed Sakhawat Hossein, Bengal Agricultural Department)

THE condition of Indian agriculture is primitive: the same plough and the same harrow, and, it may be said, the same "everything" are still in use, with which agricultural operations were performed in the olden times. The recent discoveries and new inventions for facilitating agricultural labor are unknown in this country. An Indian cultivator is said to be a conservative of conservatives, and is at times unjustly reproached for want of enterprise. But it must be said that circumstances beyond his control have mainly contributed to the present backward condition of Indian agriculture. Before the advent of the British Power, the fiscal system of the country was very faulty, and the security to the cultivator for the enjoyment of the fruits of his labor was insufficient, not to say precarious. Such was decidedly the case during the Mahomedan supremacy. In the days of Hindoo supremacy, wants were few and harvests plenty. India in those peaceful days was little in communication with other lands, and her commerce was confined to a few countries. The necessity for over-production was not felt, as the fertile soil of India yielded freely, and with little labor, what her population needed. But all this is altered now. India is no more a secluded country shut out from all others; her ports are free, and her merchandise finds ready sale in foreign markets. We are living in the days of incessant progress and advancement, when nothing is stationary. The population is ever on the increase, while the simple habits of old are being slowly but surely replaced by expensive ones. New tastes are being acquired and new ideas of living learnt. This change, though silent, is none the less sensibly felt, and attention will now have to be directed to find means to increase the produce of the land. India at present is purely an agricultural country. Other Industries are few and little followed. Agriculture is not only her main source of food supply, but it has to supply all other wants, and now, when more is wanted, the land is beginning to yield year by year diminished crops. The complaints of drought and scarcity of water from parts of this continent have become more frequent, and the general prosperity of the country appears to have been affected. The aid of science and arts, hitherto not required in the pursuit of agricultural industry, has now become a necessity. The slow but certain process of exhaustion has to be arrested, and the land is required to yield more than hitherto to supply the increasing wants of an increasing population. The introduction of new methods and new appliances will sometimes fail to produce satisfactory results, but experience and success can only be achieved by sacrifice and failures. Of course the hasty adoption of new methods is to be deprecated Progress is always slow, and slowly must we advance. It is unfortunate that agricultural industry in this country should be chiefly pursued by ignorant ryots of limited means, who are, at the same time, wanting in the spirit of co-operation. For success in any industry, intelligence and capital are necessary; and in both of these our present class of cultivators are sadly wanting. But however much we may deplore this state of things, we must accept the situation. I propose in this paper to point out some of the implements and appliances well within the means of an average ryot, the adoption of which may lead to better results. First and most important of the implements which I would advise him to adopt, is the improved plough. With the native implement, mis-named a plough, much time and labor are wasted, and the results obtained are unsatisfactory. The native plough merely scratches the ground; while the object of ploughing is primarily to pulverize the soil; and this cannot be done with any degree of efficiency by the use of the native implement. I would not insist on inverting the furrows, but the soil must be dislocated, or else the loosening of it cannot be properly effected. With ploughing and cross ploughing some result, I grant, is obtained, but at the expense of much valuable time and labor, at a period when both are precious commodities. With the improved plough, such as those made at Cawnpore or Madras, more work will be done at less expense, and in less time. The cost of such a plough is not by any means prohibitive. A native plough costs about one rupee, and the improved plough six rupees. The native implement requires constant repairing, and some parts of it replacing; while the quality of the work done is inferior.

Next to the plough is the harrow. This implement is a very necessary adjunct to the improved plough; for without it the desired pulverization of the soil is difficult. I would recommend a light zigzag harrow with teeth of iron slightly inclined forward. The frame may be of light wood so as to reduce its weight to suit the weak draught animals used in this country. This harrow will serve the purpose of pulverizing the surface; giving a good seed bed for germination of seeds; of smoothing the surface, and of gathering and shaking out surface weeds. It will also serve the purpose of covering the seed when used for that object Of course this light harrow will not reach the whole depth of the plough, but this is not necessary, inasmuch as the growing plants will be strong enough to send their roots down through to the loosened soil, and a fine tilth for the germinating seed is all that is necessary. A light wooden roller is also one of the implements that a cultivator ought to have. Firm seed beds are required for some crops, and the native methods of using a wooden plank called *chowkie* in this part of the country is hardly sufficient. A trunk of a tree made into a smooth cylinder will quite answer the purpose of a roller With the harrow and the plough, costing altogether Rs. 9 or 10, and a cheap country-made roller, preliminary operations of preparing the soil for the reception of seed will be satisfactorily performed.

In sowing, it is always more economical to dibble than to drill, and to drill than to broadcast. This is only a general principle, not always practicable. Of course, an Indian ryot is not to learn how to sow seed. In that, I take it, he is an adept. For rice it would perhaps be always desirable to broadcast seed; but still I think sowing in furrows will be of advantage for subsequent treatment of the crop. In countries where labor is cheap, as in India, dibbling might be oftener resorted to than it is. Dibbling merely consists in depositing seeds in holes made with wooden nails. Drilling is not quite unknown in this country, as may be imagined. Some of the ryots here attach a bamboo tubing, with a funnel on the top of it, to a plough, and as the plough proceeds, a man goes behind dropping seed into the funnel, and the seed passes on to the tube, from which it falls on to the ground. This mode of drilling is inexpensive, but hardly efficient. With some slight improvement in this native method, it could, I have no doubt, be made, more efficient. The native plough is undoubtedly a very good hoeing implement, and may be used for that purpose, especially in maize fields. The ordinary *khoorpee* of the country, with some slight alteration, can be easily converted into a good hand hoe. It has been found by experience that a man can work better standing than sitting, and hand hoes might be fitted with long wooden handles, so that they can be used standing. A long wooden fork with two or three iron prongs will be a very useful and convenient implement in the hands of a cultivator, and will serve various purposes.

The native method for reaping is crude and simple. Of course, I would not, in the present condition of agriculture in this country, advocate the introduction of reaping machines, but I believe the use of a scythe, instead of a sickle, would greatly facilitate the operations; and a scythe will not be very expensive either. The system of threshing in this country is certainly very primitive. The work is performed by cattle, with their mouths muzzled, treading on the crop, and it is not done well. The dust and other foreign matter get mixed up with the corn, and the sample is necessarily depreciated. Then again this threshing has to be done in an open *khalian*, *i.e.*, an open yard in a field, when the crop is subject to rain and foul wind. The use of a flail, an old method of threshing in England, now fallen into disuse, would be a great improvement on the native system. A flail consists of two unequal wooden rods, and the two parts are attached by means of thongs of strong leather. The longer rod is 5 feet in length, and the shorter 2½ to 3 feet. Both are cylindrical, with diameters 1¼ to 1½ inch, and should be made of strong wood, so that the rods may not split. The smaller rod, when the flail is worked, should fall evenly on the threshing floor, and for this purpose it would perhaps be desirable to have the "beater" slightly tapering towards the extremity.

I have so far attempted to direct attention to a few of the agricultural implements which may with advantage be adopted by Indian cultivators, and which, certainly, are within the means of many of them. I have omitted making any suggestions regarding the most important element in the success of agricultural operations in this country, *viz.*, irrigation. Want of water is the main difficulty here, and any cheap mode of lifting and increasing the quantity of available water for irrigation purposes should have been pointed out. I consider, however, this subject of irrigation very important, and fit to be treated separately. I purposely reserve it for a future paper.

THE UNIVERSAL FIBRE DECORTICATOR.

The want of a thoroughly adaptable fibre-cleaning machine has long been felt in India. Handsome rewards have, from time to time, been offered for the best decorticator, and it was only in December 1884 that the Bengal Government awarded the prize of Rs. 2,000 to Messrs. Death and Ellwood, of Leicester, for their Universal Fibre-cleaning Machine, invented by a Mr. H. C. Smith, as being the best out of nine machines tried at Calcutta, under the management of two gentlemen appointed by the Government of India to carry out the experiments with these machines. When this award was made, it was thought that perfection had been reached as far as it was possible to attain that distinction, and it was confidently expected that Messrs. Death and Ellwood's machine would hold the foremost place among decorticators. But the New Orleans World's Exposition has taxed the inventive genius of the American nation, and there is every reason to believe that a powerful rival to Death and Ellwood's invention has been on exhibition at the New Orleans Exposition. The American papers are full of descriptions of this machine, which are so flattering to its general usefulness and adaptability that we have from time to time noticed it in these pages; but as it promises to excel all other fibre-cleaning machines, our readers will perhaps wish to know somet[illegible] detail about it.

Mr. Jules Juvenal, who recently lectured at the New Orleans Exposition on ramie, or rhea, describes this machine, which is called the Universal Fibre Decorticator, as consisting essentially of three pairs of rolls and a pair of endless aprons. The machines are of two styles. One is designed so as to enable the feeder to deliver the stalks. The other requires a workman at the rear end of the machine to take the cleaned fibre, the feeder being constantly employed in supplying the machine with material. In the first style the front rolls are smooth: the second are fluted, running about seventeen revolutions per minute. The third pair are armed with scraping blades, rigidly fixed to their periphery and winding spirally around the rolls. These rolls are also hollow, with perforations through their shell, through which water is allowed to flow for the purpose of keeping the blades clean from gum; also to wash the fibre, running 300 revolutions per minute. The material is placed on the table, and is passed half-way or more into the machine, then run back on the table, reversed, and the other end cleaned in the same manner. The second style of machine has scraping rolls in place of the smooth rolls, as in the first style. These rolls perform the office of feeding rolls, and also of cleaning the passing ends of the material by reversing the pairs of rolls, instead of the material being operated on.

This gentleman does not pay a high compliment to the experiments conducted at Calcutta under the auspices of the Government of India in 1884, which awarded the prize of Rs. 2,000 to Death and Ellwood for their Fibre-cleaning machine; nor does he hold this machine in very high estimation. He says:—

> The competition at Calcutta, made under impossible conditions, retarded the invention of a practical machine; for, besides the difficulties presented by distance and the absence of material for experiment, the European mechanics were asked to produce machinery which could accomplish the delicate and tedious hand labor of the Chinese workmen, who made a pound of ramie a day by scraping with a wooden knife a part of the gummy and resinous matters. If experiments had been made in London instead of Calcutta on green stalks coming from Jersey, the absurdity would have been quickly ascertained of asking of practical machinery more than the mere separation of the fibre, which in the green state is easily accomplished, leaving for chemical agents the task of eliminating the gummy and resinous matter adhering to the bark. There lies the whole secret. If all inventors of decorticating machines some of whom are very clever, have heretofore, failed, it is because they have aimed at filling the conditions imposed for the Calcutta competition; that is, to make a machine capable of producing directly the China grass. This, nevertheless, came near being accomplished last year at Calcutta; but with what paltry results! The Smith machine, of London, which obtained a prize of 2,000 rupees, or £1,000 (£200?) produces, with two men and a three-horse power, sixty pounds a day.
>
> Under such conditions ramie would be twice as high as silk. What is needed is a combination by which production, cleaning and fabrication will give a silky fibre ready for the loom at a cost from twenty to twenty five cents, about the price of first rate flax.

The *Times Democrat* has the following flattering description:—

> The exhibition of the Universal Fibre Decorticator, T. Albee Smith's patent, in the Machinery Annex in the presence of a large and essentially practical audience, was an event in Exposition history to be remembered as affording ocular demonstration of the merits of a machine, which, if all signs do not fail, is destined to become an important factor in the utilization of fibrous plants. Among those present were noticed the commissioners from Japan, China, Mexico and various States of the Union, together with a number of scientists, capitalists, and mechanical experts forming such a representative audience as probably never assembled at any other exhibit in the Exposition, all of whom were unanimous in their expressions of approval. Of the mechanical construction of the machine so much is already known that recapitulation is unnecessary; hence, suffice it then to state that it fully justifies everything that can be said in its favor as a fibre decorticator, which, as its name signifies, is universal in its adaptability to the purposes for which it was created. The most noticeable points of superiority of this machine were manifested in yesterday's illustrations of its method of handling and quantity and quality of the product in hemp, flax and green ramie.
>
> In working hemp and flax the cleaning mechanism was observed to be less severe than the processes hitherto employed, and as the

successful results there was less waste or tow. Another special feature, peculiar only to this machine in working dry material, was the forcing of air into the cylinders and against the fibre on both sides at the same time, thus absolutely freeing it from woody substances, dirt or dust, and bringing out the product perfectly clean. With green ramie, grown in New Orleans, the results were equally satisfactory. The ramie, just as taken from the field, leaves and all, was fed to the machine, and came out sans everything, but the pure fibre. Dry ramie stalks were also most favorably handled, though for best results and economy it should be worked in a green state. This fact became more evident when examples of the machine's operations were made with jute stalks of last year's growth. While the product was the same in point of perfect decortication as if the jute was green, the fibre was discolored by the drying of the bark. As farther argument of the universal application of the machine to all fibrous plants, examples were given with banana and sisal hemp, in both instances forcing conviction of Mr. Smith's claims to having with his machine successfully overcome the greatest obstacle which has hitherto beset the way of a great money-producing industry—ramie and jute culture in the South. Mr. Smith's machine is on exhibition in the Machinery Annex, and to those who desire to study it, Mr. Smith is happy at any time to show its operations.

A correspondent, writing to the *Baltimore Manufacturers' Record*, says that "the Universal Fibre Decorticator is operating on banana, sisal hemp canes, silk grass, hemp, or any other fibrous plants available. It is claimed that it is the only machine on exhibition that undertakes to handle green plants. A guarantee is given that it will prepare any of the fibres commonly known in commerce (except cotton and silk,) making a superior product, and at less cost than any machine ever offered for sale, and the manufacturers enter it for competition against any machine manufactured anywhere at home or abroad. The exhibit is under the charge of Mr. T. Albee Smith, who will be glad to show it to any one who desires to witness its operations."

With such testimony, we can only conclude that this machine is destined to supersede all others in the cleaning of fibres. It is a curious coincidence that the inventors of both, Death and Ellwood's and this machine, should be named Smith. There is some fear of a confusion of identity unless care is taken to avoid mistakes.

It will be observed from the quotations we have made that the Universal Decorticator cleanses green fibre, and the most extensive experiments were tried with ramie in its green state. It is perhaps superfluous to observe that the ramie of America is identical with the rhea of India. Its scientific name is *Bœhmeria nivea*, and is known also by the name of the China grass-cloth nettle. It is very extensively cultivated in the N.-W. Provinces and the Punjab, where it thrives to perfection. It has attracted a great deal of attention of late years, and the only drawback to its cultivation on an extensive scale for commercial purposes, was the want of a machine that would decorticate its fibre in the green state thoroughly. It is claimed for rhea that its fibre resembles, in texture and strength, silk more closely than any other fibre, and is the most valuable for all purposes. Now that a machine has been invented that answers every want, our Indian capitalists should lose no time in procuring the Universal Fibre Decorticator. It is manufactured by the Remington Agricultural Company, Missouri, U.S.A., and application should be made to Major F. F. Hilder, agent for that Company, at his office which is situated at No. 99, Poydras-street, New Orleans. We would, at the same time, recommend some of our enterprising firms to interest themselves in the establishment of an agency in India for this Fibre machine, as it is certain to take a prominent place at no very distant date.

RAMIE, OR RHEA.

The plant, known as ramie in Europe and America, is the same as our rhea, and belongs to the nettle order, Urticaceæ, and is known to botanists as *Bæhmeria nivea*. There are other varieties of this genus, but all are remarkable for the valuable fibre they yield. The ramie has formed the subject of much writing; and although a great deal is known about it, anything that will add to our knowledge of the plant and its value as a commercial product cannot fail to be of interest. We thus find that Mr. Jules Juvenal has been lecturing at great length on this subject at New Orleans while the Exposition there has been in full swing. We reproduce below that portion of his lecture which relates to the plant, omitting all mention of the machinery for decorticating the fibre, an account of which will be found elsewhere. We shall simply preface Mr. Juvenal's speech by the following remarks which should be borne in mind when perusing the lecture :—The ramie or rhea grows to perfection in India. It thrives in nearly every part of India, but best in the N.-W. Provinces. There are extensive plantations of it at Saharunpore in the N.-W. Provinces, and in many places in Bengal. It is usually propagated by division of roots, but equally well by cuttings. In both methods the plantings are made in February; but in some parts, in May and June. It is a hardy perennial, and once planted, will last, if not for a hundred years, at least quite as long as any ordinary individual could wish it to. In India it has been known to yield as many as four crops in one year. It delights in rich black clayey loam, intermixed with river sand, but thrives almost in any soil. And now let us hear what Mr. Juvenal has to say. He begins as follows :—

The industry of textiles is the foremost of all industries. It is that which all over the world gives employment to the greatest number of laborers, brokers, merchants, and manufacturers. The consumption of its product is diurnal and within limit. The world has ever been looking for new textiles, but particularly so since the past fifty years, which have brought about a general increase of population and modern improvements in the fabrication tissue. The attention of the manufacturing world has during the last few years principally been called to ramie, or China grass.

What is ramie?

It was formerly placed by botanists in the class of urtica, or ortie, but it is now called bœhmeria, or spearless nettle. I will call it by no scientific name. I will simply name it the richest of all plants, for it possesses wealth of growth, wealth of development, and wealth of fibre. In ordinary light ground, with a little watering now and then, no plant will grow as rapidly, no root will multiply quicker, and produce more stalks, no vegetable fibre is handsomer, richer, or more silky, than ramie. Notwithstanding all these elements of success, the Chinese alone have for a thousand years past extensively cultivated the ramie plant. How comes the civilized world to be thus backward in introducing a plant of such excellent return, and known in Europe since the beginning of the present century? For my lecture to-day, I will endeavor to inform you concerning—

1. *The causes which have delayed the cultivation of ramie in Europe and America.*
2. *The best methods for its cultivation and production.*
3. *The chemical treatment of ramie and of all textile plants.*

The chemical treatment is the complement of all decorticating machinery, for it takes away by dissolution all gummy and resinous matters adherent to the fibre, which no machinery can completely eradicate. I will tell you how this can be accomplished chemically, not only with no injury to the fibre, but with the result, on the contrary, of adding to its silky qualities. This perfected chemical process is the property of our firm, the Ramie Fibre Manufacturing Company, of New York, of which I have the honor of being director. It is by applying this disintegrating process to the ramie fibre, which offers the most resistance of all, and witnessing its excellent results, that, pushing forward our researches and experiments, we have succeeded in applying to all textile plants the same process at modified degrees, according to the resisting force of their various fibres. Many of these grow in abundance under your own latitudes, the pita and silk grass of Honduras (remarkably fine fibre), the common bagasse of your sugar cane, the typha, or common cat-tail, which grows abundantly in New York, New Jersey, and Sandy Hook, the bowstring hemp or Florida lily, the yucca of the Gulf coasts, the banana, the plantain, the ixle, the bear grass, the Spanish dagger, the lichegulla, the Mexican maguey, etc.

With the exception of the cat-tail, or typha, which may be monopolized by New York, all the plants which I have named can be imported in leaves—that is to say, in its crude state, free of duty, to New Orleans, which is naturally destined to become first their natural depot, and then their place of transformation into textile fibres, by the establishment of factories along your lake coast. By this means New Orleans would become the chief market of the world for textiles, and it will have been one of the results of your Exposition. I will show you later on how this is to be effected. But let us for the present go back to ramie.

The first shipment of ramie from India to England was a lot of three bales, shipped in 1810. Experiments then showed that a ramie rope could support a weight of 252 pounds, while a Russian hemp rope of the same size would break on the weight of over eighty-four pounds. The ramie question remained at a standstill during the time of the wars of the Empire, and the political questions which disturbed Europe during the first half of this century. It is only in 1862, and during your great war, in which the bravery, gallantry, and death-daring qualities of the Southern people attracted the admiration of Europe, that the subject of ramie industry was resumed. Experiments were made in London and in Rouen to mix cotton with ramie. Messrs. Cardier & Co., of Rouen, successfully wove a lot of Egyptian and Indian cotton, mixed half-and-half with out China grass. The warps thus obtained proved much superior to those woven out of pure cotton, but the difficulties presented by the irregularity of the Chinese market, which failed to supply a sufficient quantity of China grass, and the necessity of special looms, caused the abandonment by the fabricators of that special tissue, and cotton having resumed its normal prices was taken back as the sole agent of fabrication. In 1869 the English Government of India, believing in the future of ramie, and with the intention of introducing it into the public domain, instituted a prize of £5,000 for the best machine for decorticating in the green state.

Innumerable pamphlets and lectures on ramie, mention this circumstance as being the cause of the progress made by that textile. I am of an entirely different opinion. I think that the allurements of that prize of £5,000, though made with the best intentions, but to which were attached impracticable conditions, helped greatly to retard, by the rejection of the machines presented, the development of ramie culture. European mechanics were asked in Europe to make machinery for use in India, to work a product scarcely to be found in Europe even for purposes of study or experiment, and consequently appropriate modifications of mechanical appliances. The English Government would have done better in applying to the culture of ramie in Europe the amount of the premiums offered for the Calcutta machines. A few acres of ramie in the Island of Jersey, where a retired French Colonel cultivated it with success, would have furnished French and English mechanics all experimental material necessary to obtain a practical solution of the problem, which could have been demonstrated by competition in London.

Jute, notwithstanding its low price and easy decortication by rotting, and though imported into England since 1796, remained fifty years without being utilized to any considerable extent. It was only in 1840 that a merchant of Dundee persuaded the Holland home government to use jute bags, instead of those made out of flax, for shipments of coffee by the Government in India. A vast field was thereby opened, and jute since then has made considerable headway. The same will happen with ramie, whose fibre being so much more valuable, has been environed by nature with more obstacles to its decortication, and it is not surprising that some time and money have been lost in attempting to solve the problem. Like all great schemes, the ramie question is liable to the accusation of having enthused, crazed, and ruined a large number of its devotees. An extensive field of ramie is a beautiful thing to look at, and when at the same time one considers that the simplest kind of study demonstrates that the bark of each stalk presents an extraordinary wealth of fibre, astonishment ceases at the fervor of the adepts of this plant.

The question of machinery is now solved, and we will have as many machines as we want, so long as they are asked only to work the crude bark either green or dry. *Production should now be our only pre-occupation.* Planting should be done at once—May or June—so as to raise a crop in autumn, and I will demonstrate that a net profit of $100 per acre can be made, during the year following the first plantation. But what climate is adapted to ramie culture? What quality of soil? How shall we plant? Where are the plants and roots? How shall we cultivate and reap? How will the crop be sold, and what certainty is there in the future of ramie?

The State of New Jersey, whose Legislature had offered a premium to ramie planters, has cultivated this plant with success, by protecting its roots with straw during winter. I would, nevertheless, advise planters in the Northern States to cultivate it only on a small scale. This is not the case in Southern States, from California to the Carolinas, where by planting in a light soil, somewhat moist and easy of irrigation, success is certain, however extended may be the enterprise, this particularly in Louisiana, Mississippi, Alabama, Florida, Texas, New Mexico, and California. The banks of the Mississippi, from New Orleans to Cairo, will soon, I am confident, be green with ramie, and if your levees are not absolutely secure, it seems as if ramie had been made for such a contingency, as a sojourn of even a whole month under water does not destroy this plant. In support of this I will mention a circumstance which happened in Louisiana. Mr. Laforest, of Bayou Heron, who had a half arpent of ramie that remained two months under water, after withdrawal of the waters found the plants in good condition. Evidently there is a limit to all things, but it is well established that complete immersion for two or three weeks will not injure the ramie.

(*To be continued.*)

Miscellaneous Items.

A SMART shock of earthquake was felt at Srinugger, at 3-50 P. M. on the 19th June, which levelled several damaged houses.

THE appointment of Special Judge of Agriculturists, at present held by Dr. Pollen, will be abolished from the 1st of August next.

NEWS from Cashmere states that the road near Baramulla is quite impassable. Everything considered, it seems just as well that Cashmere leave is not open this year.

THE filter works constructed at Poona four years ago, at a cost of Rs. 23,000, have just been condemned by the Sanitary Commissioner, Bombay, as supplying water unfit for drinking purposes.

WE learn that Mr. T. E. Coxhead, C.S., Magistrate of Burdwan, who is at present on a tour of inspection, is now at Sahibgunge, superintending the distribution of provisions, at Government expense, to the starving population.

OWNERS of good and strong bulls suitable for ploughing purposes are sure to obtain good prices if they would send up their cattle to Bangalore, as there is a scarcity of ploughing cattle, and some ryots are paying handsome prices for bulls.

THERE is some talk of a veterinary class being established in Poona. The idea is a very good one, as in a place where so much interest is taken in horses and in their training, there should be found many willing to join a class at which they might profitably learn something that would be advantageous to them in more ways than one.

IT is in contemplation, we believe, to establish a regular consular agency in Yarkand. Private news from England states that the consent of China has been obtained to the presence of a permanent British Agent in that outlying dependency of the Celestial Empire; and the step is a highly necessary one, in the face of the general activity of Russia in Central Asia.

THE result of the sittings of the Mixed Committee, to settle the claims of the proprietors of the salt-pans who had entered into a contract with the British Government, has been, on the whole, favourable to the Portuguese side. The proprietors at Salsette, Bardez, and Damaun came off well, but those at Ithas have had to submit to a reduction of 25 per cent on their claims.

AT a mass meeting of working men held at Swansea lately one evening, for the purpose of protesting against the proposed increase in taxation on beer and spirits, there was great opposition, and the motion calling on the Chancellor of the Exchequer to withdraw the proposal was negatived by a small majority. The meeting broke up in great confusion, the chairman proclaiming, amid the protest of the majority, that the motion was carried.

ACCOUNTS from planting districts in Ceylon shew that the flushing and making of tea progress in a most satisfactory manner, and it is anticipated that heavy shipments of this product will be made during the remainder of our produce season. The planting out of tea goes on as briskly and as extensively as ever, and all estimates of this work for the season will be fully borne out. Every estate is busy planting tea almost entirely through the coffee, and the acreage put under the new product in this way, this season, will be enormous.

THE total number of deaths registered in the Suburbs of Calcutta during the week ending 6th June was 184, against 154 and 176 in the two preceding weeks. Under the head of cholera there were 26 deaths, against 30 and 51 in the two preceding weeks. During the week under notice there were 3 deaths from small-pox, 71 from fever, 16 from bowel complaints, 2 from injuries, and 46 from other causes. The general mortality was at the rate of 33·9 per 1,000 per annum, against 31·5 and 36·4 in the two preceding weeks; while it was 22·6 in Calcutta during the same period.

THE salt trade at Jodepore, it is anticipated, will receive a great impetus in consequence of the completion of the line of rail, so long in course of construction, and which is now open to traffic, mainly owing to the exertions of Maharaja Protap Singh, C.S.I., on whom the successful completion of this railway reflects the highest credit. When he first assumed office as Prime Minister, the Raj was involved in debt to the extent of forty-eight lakhs of rupees, which has not only been paid up in full, but the enormous amount of sixty-three lakhs—thanks to his financial measures—has been devoted to the construction of this line.

THE total number of deaths registered in the city of Calcutta during the week was 144 against 184 and 188 in the two preceding weeks, and 24 less than the corresponding week last year. The mortality from cholera has been unusually low during the week; 10 deaths from this cause were registered, against 16 and 27 in the two preceding weeks, the quinquennial mean being 25. There were 3 deaths from small-pox, against 3 and 4 in the two preceding weeks. Fever and bowel complaints were somewhat below the average of the quinquennial period. The general mortality during the week was at the rate of 17·3 per 1,000 per annum.

THE oldest bank-note in existence in Europe is one preserved in the Asiatic Museum at St. Petersburg. It dates from the year 1399 B.C., and was issued by by the Chinese Government. It can be proved from Chinese chroniclers that as early as 2697 B.C. bank-notes were current in China under the name of "flying money." The bank-note preserved at St. Petersburg bears the name of the imperial bank, date and number of issue, signature of a mandarin, and contains even a list of the punishments inflicted for forgery of notes. This relic of 4,000 years ago is probably written, for printing from wooden tablets is said to have been introduced in China only in the year 160 A.D.

WE understand Mr. Batchelor is engaged in his report for the Straits Government. Not only will it treat on the subject of the cattle-disease that played such havoc in Java and the Malay Peninsula, but there will be a *vade mecum* of the diseases that affect horses in the Straits, the method of treatment, &c. Mr. Batchelor on his visit to Europe ascertained the best method of preparing anthrax vaccine, and it was for this object the journey was taken: the difficulty of obtaining vaccine in a fresh and pure condition from Paris is no longer a matter of necessity. Anthrax vaccine is now being prepared at Ootacamund, and can be supplied direct from Mr. Batchelor's laboratory.

A PUBLIC meeting had been convened for Thursday, the 18th June, and held in the Council Chamber, Ceylon, under the presidency of his Excellency the Governor, when resolutions were proposed on the subject of the forthcoming Indian and Colonial Exhibition to be held in London in 1886. The Governor invited the public to attend, and we hope that a large number were present on the occasion. Let it be distinctly understood by all, that if Ceylon is to take part in the Exhibition she should be well represented, or not represented at all. The thing should be *well* done, or left entirely alone. If, as seems probable, the Government will give their utmost aid in this matter, and such a grant of money to begin with, as has already been mentioned, namely, Rs. 50,000, much may be done.

DR. BLANEY of Bombay, has addressed a thoughtful and considerate letter to a contemporary on the necessity of building health resorts for the poor Hindoos in the capital of Western India. The philanthropic doctor, who must be accepted as an authority on the subject, draws a deplorable picture of the condition of those who have certainly a claim on the good services of their more fortunate fellow-creatures. The following sentences speak for themselves:—"Nobody visits these poor in their sickness, and nobody cares for them. They lie panting, and drowsy, and helpless, in fevers, away from light and fresh air, and die when they ought to recover. If any one at all gives them help, it is neighbours who are as poor and ignorant as themselves, and, as a consequence, the help is not very useful; thus it is that the poor bear the burdens of the poor."

A TELEGRAM from a correspondent at Srinugger, dated June 24, says:—An estimate of the severity of the late earthquake, and the extent of the damage done, and loss of life, is being slowly ascertained. I have visited during the last few days the country near Baramulla. In a space of ten miles long and eight wide, the entire country, comprising low hills and valleys, all well wooded and cultivated, is marked with fissures and landslips. Trees have been uprooted, and nearly every house has been made level with the ground. On the crest of each hill, where a village of five to ten, and sometimes fifty houses, was built of wood, in all, about eighty or ninety villages have been destroyed; in half of these, the number killed is shewn to have been 500. The loss of sheep and oxen is also very great, as they are frequently placed at night in houses with the inhabitants. The loss of life throughout Cashmere cannot be under two thousand. In some of the villages, every inhabitant has been killed. Colonel Lockhart and his party arrived at Baramulla on Sunday week last, and visited Srinugger for a few days, then marched to Gilgit. The camp proceeds direct.

Selections.

MANUFACTURE OF CUTCH.

IN a letter to the Conservator of Forests, Pegu Circle, British Burmah, dated 5th August, 1884, Captain Wood writes as follows:—

"I enclose an extract from the *Indian Forester* for July 1884, page 330, and beg to state that in my Circle, the season for manufacturing cutch extends to only three months in the year, and that the rates levied here from catechu makers are 12 annas a pot, capable of holding about three gallons of water, or liquid substance. The rate has been raised this year from 9 to 12 annas per earthen pot, which even seems to be a very low price compared with what you get in Pegu. I should feel much obliged if you would kindly give me the following information:—

(1). The length of the season during which cutch is manufactured in your Circle.

(2). The out-turn per season, per cauldron of 20 gallons.

(3.) The process of manufacturing as conducted in Pegu.

(4). The price per maund of catechu on the spot.

(5). The distance of the market from the forests where the cutch is sold to retail dealers and others.

(6). What percentage of cutch is obtained from a maund of heart-wood?

The Conservator of Forests, Pegu, replied as follows, on the 5th September, 1884:—

1. "Cutch is manufactured in this Circle from 1st June to 31st March; but the months from December to March (inclusive) are those in which the manufacture is most energetically carried on. In April and May, and in the drier parts in March even, scarcity of water stops the work; while in the rainy season carts cannot ply, and boilers have difficulties in provisioning themselves and disposing of their cutch.

2. "The out-turn of a cauldron per season depends on such a variety of circumstances—the duration of the season, the quality of the trees, their proximity to the boiling place, and above all, the working days of the party—that an average cannot be struck. It may be 2.000 lbs. only, or it may reach, and even exceed, 6,000lbs. for a cauldron of 20 gallons (those in use have a capacity of 12 gallons)."

3. Mr. Carter, Deputy Conservator, Tharrawaddy, well describes the process of manufacture as follows:—

"For the working of one cauldron, three men are necessary; but if a larger number of cauldrons are employed, there is some saving in labour. Of the three men, one man is employed in felling the trees, and dragging them, by means of cattle, to the cutch-boiling place. The second clears the logs of sap-wood, and cuts the heart-wood into chips. The third attends to the fires and the boiling process. The chips are put into earthen pots, which are filled with as many chips as they will contain; then water is poured in until the pots are nearly full. The pots (which have a capacity of about 3 gallons) are then placed on the fire and boiled for about 12 hours, in which time the water is reduced to about one-half the original quantity. For one cauldron, 20 to 25 of these earthen pots are employed. The cauldron is nearly filled from these pots, and when the extract in the cauldron is reduced to about one-half, the cauldron is again filled from the pots, and this is repeated until the pots are emptied. The boiling process is generally accelerated by the employment of a large earthen pot which is set up near the cauldron, and is filled at the same time as the cauldron and kept boiling, the extract from the small pots being constantly added as that in the larger pot is reduced. The cauldron is then filled from the large pot instead of from the small ones. The Burmans call this large pot the Ye-ni-o, or red water pot. The extract from the pots having all found its way into the cauldron, the boiling is continued, and the liquid is stirred until it attains the consistency of syrup and fills only about one-fifth of the cauldron. The cauldron is then removed from the fire and stirred with a piece of wood, shaped like a paddle, for four hours or more, by which time the mass has obtained a greater consistency, and is cool enough to be handled. It is then placed in a mould, like a brick mould, and is left to cool. This generally happens at night, and by next morning the result is a brick-like mass of cutch weighing 36 to 44 lbs."

The stirring business, which takes place after the cauldron is removed from the fire, is more of a beating up, and I have never been able to ascertain what the object or effect of the process is.

Cooks differ too in the amount of heating up that is desirable, some being satisfied with half-an-hour's application. The out-turn of one cauldron of 12 gallons, in 24 hours when properly worked, is fairly constant at the figure given by Mr. Carter.

4. Cutch was worth last year Rs. 4·38 to Rs. 5·58 per maund (equivalent Rs. 15, Rs. 20, and Rs. 25 per 100 viss) on the edge of the forest, according to the distance from the Irrawaddy river or the Railway.

5. The above rates correspond to some 40, 25, and 15 miles from the markets on the railway and river, where the price was Rs. 30 per 100 viss (365 lbs.), or Rs. 6·58 per maund.

6. Regarding the amount of cutch yielded by heartwood, no reliable data are available. The yield has been stated at from 3 to 10 per cent in weight.

For practical purposes, I believe a ton of timber in the round may be taken to yield 250 to 300 lbs. of cutch."

The following note from Captain Wood closes the correspondence:—

"It appears that in Pegu the cauldron is used for the final concentration, and the price is regulated by it. 20 to 25 pots of the size used in Oudh are used to supply the 12 gallon concentrating cauldron, so that the prices levied are much the same in both provinces, as will be seen by the figures given below :—

	Rs.	A.	P.
Pegu.—Price for 4 months' working 12 gallons cauldron, i.e., 20 to 25, say 22½, 3 gallon pots=	20	0	0
22½ pots, at 12 annas=	16	14	0*
Add ⅓ more for the 4th month=... ...	5	10	0
	22	8	0

-*Indian Forester.*]

DESTRUCTION OF TREES IN THE PUNJAB.

The destruction of trees and undergrowth on hill-sides is causing trouble in other parts of India besides the Punjab. One of these places found is in the hill tracts of the Chota Nagpore Division of Bengal, which were visited by the Inspector-General of Forests last winter. In his report, Dr. Schlich states that the floods of the Damodur river, which of late years have done much damage in Burdwan, are largely due to the clearance of forests in the upper catchment basin, much as the floods which afflicted the Hooshiarpore and Jullundhur districts some years ago were due to the destruction of forest growth on the Siwaliks. The state of things is more serious perhaps in Chota Nagpore than is usually the case elsewhere in India, as attempts have been made for some years past to induce the people to form reserves of their own, and to refrain from their evil treatment of forest areas ; and these attempts have so far proved a complete failure. Dr. Schlich proposes that the people should now be urged to apply to Government to manage their forest lands for them ; and if this cannot be done, areas of waste land should be leased by Government from the people : and that, if this again is impracticable, Government should buy up waste areas. The first proposal is not likely to bear much fruit, as far as the Forest Department is concerned. If there ever was a case of *timeo Danaos et dona ferentes*, it is, whether rightly or wrongly, the case of the people of India and their Forest Officers. Leases are perhaps possible, but it is difficult to secure them without the exercise of much official pressure. For the purchase of lands on the other hand, money is seldom forthcoming ; although the *Forest Department* might fairly claim to have a percentage *of its* nett annual earnings put aside to enable it to lease and buy *lands as opportunity offers.* The whole question is one beset with thorny difficulties. On the one hand, it is most necessary to restrain the people from their present wasteful practices, and to prevent their squandering a property which belongs in some sense to the public, and in a distinct sense to future generations of the owners of the land on which the forests stand. On the other hand, the customary rights of the people have grown so strong, that to attempt to put an end to them, is apt to shake the village constitution and faith to its very foundations. The question, however, requires to be considered from a broad point of view, in order that distinct principles may be laid down, once for all, for the clear guidance of officers with regard to it. There is no matter upon which opinions differ so widely at present, or on which views are so apt to change violently according to the personal likes of an individual officer. We believe it is the intention of the Punjab Government to reserve large areas for the formation of plantations in the west of the province as the colonization of that country proceeds. And if the development of trees and canals in those tracts should prove successful in increasing the rainfall, the great-grandsons of the present generation may see areas, which are now absolutely wastes, become one of the principal sources of the timber supply of the Province.—*Civil and Military Gazette.*

ART INDUSTRY IN INDIA.

TO THE EDITOR OF THE "BOMBAY GAZETTE."

Sir,—I was much interested in reading, in your issue of the 16th instant, the account of a Hindoo student who had recently returned from America after acquiring the art of glass-making.

I entirely agree in thinking that it is of the utmost importance to promote art industries in India. About a year ago, when reviewing the progress of the Cutch School of Art, I observed as follows :—

"A sound, scientific, and technical education is the crying want of India, and Cutch is no exception. When we review the history of most of the western nations, which now occupy a prominent place in the scale of civilisation, we cannot but feel that it is their excellence in science and art which has greatly contributed to make them what they are. There was a time when India held a high place among the nations of the world, and her arts and manufactures were considerably admired. Subsequently, amidst the vicissitudes which the Aryan civilisation passed through, the decline of her industrial arts was a necessary result of the decay brought on by time.

"A resuscitation and improvement of India's dying industries, and the full development of her abundant resources, is a consummation which is looked forward to by every patriotic native of India, under the benign sway of her most gracious Majesty the Queen-Empress ; and as a means to this much desired end, it is of the utmost importance to foster a taste for technical education. We have, I think, enough of mere clerks and accountants. I can say from my experience that a petty vacancy in a public office stirs up a great number of applicants ; but when you want a superior artizan or other professional man you have to wait for some time before you find one who fully meets with your approval. This, then, is a want which, while giving every possible encouragement to primary education, has also to be supplied by establishing schools of art and industries in different parts of the country, and enabling promising youths to proceed to advanced foreign countries, and be trained in some useful arts and manufactures. This question is so intimately connected with the regeneration of India that it has deservedly attracted the attention of the thinking portion of the Indian public and the enlightened British statesmen of the day.

"The example set by China and Japan in annually sending out youths to Europe and America for being trained up in the useful arts and manufactures of the West, no doubt deserves imitation."

I believe the necessity for a measure like this is generally recognized, and I am glad the attention of certain leading Maratha gentlemen has already been directed to so useful an object.

On the occasion of his installation last [redacted] H. Maharaja Maharao Shri Khengarji Sawai Bahadur, [redacted] established a scholarship of Rs. 200 a month for a student who would go to Europe or America for acquiring such liberal or technical education as might from time to time be decided upon by the State. For this scholarship no less than 22 applications were received from different parts of India—(9 Bombay Presidency, 5 North-Western Provinces, 4 Bengal, 3 Rajputana, 1 Punjab)—a circumstance which deserves prominent mention, as it serves to shew that there are people willing to proceed to foreign countries for higher culture, if means be provided for enabling them to do so.

The question then stands thus : There is the necessity for sending Indian youths to Europe or America for being trained. There are youths willing and competent to be so sent, but pecuniary help is not available.

Cannot the exertions of the intelligent leaders of Indian society supply so pressing a want ? If united action on the part of the people in different parts in this country is not practicable, the Presidency of Bombay may well set an example by putting forth exertions within its own limits. There are several rich and important native Chiefs who may liberally come forward to establish one or more scholarships each ; others may subscribe to a common fund to which rich private individuals may also open their purse. In this way means may perhaps be found for establishing at least a few scholarships, the affairs in connection with which being managed by a committee elected by subscribers themselves.

I am so fully impressed with the necessity of a measure like this, that I have ventured to ask for a corner of your valued paper for this communication.—Yours, &c.,

MANIBHAI JASBHAI,
Dewan of Cutch.

Cutch, Bhuj, June 19.

THE POPPY IN PERSIA.

FROM time immemorial opium has been grown in Persia in the neighbourhood of Yezd, and enough was also produced there to supply the demands of the native market. Nine out of ten of the aged in Persia take from one to five *grains* of the drug daily : it is largely used by the native physicians, and a considerable export was kept up *via* Meshed to Central Asia ; the crop was considerable. During the cotton famine caused by the American war, the attention of the Persian ryot was turned to the cultivation of the cotton-bush ; but Persian cotton soon became hardly worth growing save the small amount required for home manufacture, and the villages throughout the centre and south gradually turned their attention to the growth of the poppy. Year by year this crop has become a more favourite one ; and the result has been that grain-growing has been much neglected, with the effect of raising the price in some districts. In the neighbourhood of Ispahan, as far as the eye can reach, nothing but fields of poppies are to be seen with a small patch here and there of wheat or barley, which the cultivator produces for his own use or to give some rest to his land. The white variety of the poppy is the one that is grown. It is sown broadcast and very thickly, and when it first comes up resembles a very abundant crop of dandelions. This redundance is soon reduced by the ryot, who with a short curved knife hacks away superfluous plants till those that are left stand some six inches from each other. This reducing process has to be gone through many times and the ground kept clear of weed until the plant is six inches high. The fields are also irrigated once a week until the buds are about to burst into bloom. It is this irrigation probably that accounts for the inferiority of the percentage of morphia in Persian opium. And, now that the poppies are in flour and the petals are about to fall, the ryots, under the direction of men from the neighbourhood of Yezd, who travel all over Persia to superintend the gathering of the crop and its subsequent preparation, begin to collect the opium from this plant. This is done by scoring the seed-vessels with a small three-bladed knife, which makes three gashes an eighth of an inch apart and three-quarters of an inch long. The operation is performed in the afternoon. From these gashes the opium exudes in tears, which are collected at early dawn by scraping with a piece of glass or a knife. If, unfortunately, a heavy shower of rain should fall a large proportion of, or even all, the opium may be lost. This [illegible] peated a second and even [illegible] time. The poppies, after the opium is extracted, are used as fodder. The ryot often has advances (at heavy interest) made to him upon his crop, and at times the speculator [illegible] severely bitten.

In the old days, when opium was purchased by rule of thumb, and passed through several hands before it reached the manufacture, the fresh opium was much adulterated : and it was this adulteration that gave the Persian opium the bad name it so long retained in the English market. But an enterprising English firm sent one of its partners to Ispahan, and that energetic gentleman succeeded in making the Persians understand that honesty is the best policy. The brand of the firm he represented was a guarantee of the purity of the manufactured article, and as the imports of the firm to this country were always of exactly the same standard as the sample that preceded them, Persian opium of their brand became a regular and saleable commodity. Already Persian opium has driven that of Turkey out of the great market of China ; but the quantity of morphine contained in it is far less than that of the drug grown in India. Lately the average price of Persian opium has been 16s. a pound in London wholesale. Of course the Armenian middleman continues to adulterate the drug ; but he hardly finds a profit in doing so, and his wares seldom leave the country.

When the first supplies of the drug begin to arrive at the "godown" of the merchant, they come in a semi-fluid mass, generally in a state of fermentation, giving out the characteristic smell of the drug, and therewith an odour resembling that of rotten apples. The opium is generally brought in copper pots and earthen jars—usually they are cooking utensils impressed into the service. As the opium arrives it is poured into copper pans, some of which will hold as much as five cwt. Workmen are engaged at so much a day, or in gangs who are paid so much per chest. The daily wage varies from two to five kerans (a keran being 9d.) The liquid portion of the opium is boiled down and returned to the pans, the whole is then beaten up till it is of the consistence of strawberry jam freshly made. And now begins the opium manufacture—the *teriak mali*, literally opium-rubbing. Thin planks, a yard long and a foot wide, are smeared with the paste, first longitudinally, then horizontally by means of wooden spatulas. As each plank is covered it is placed on end in the strong sun, and when sufficiently dry the opium is scraped for rolling into cakes. If the opium is very moist, or the sun very weak, this process has to be repeated. The opium is now kneaded into cakes of a pound, three drachms over being allowed for loss of weight in transit. The cakes have the shape and appearance of a large squared bun. They are varnished with some of the liquor or with a composition, and when quite dry are stamped with the maker's name. And now each cake is wrapped in paper, and laid in cases made as strong and light as possible, as the duty is levied at per case. The cases are sewn up in raw hides, or dammered—*i.e.*, packed in tarpaulin.

It does not appear that the moderate use of Persian opium in the country itself is deleterious. Opium-smoking is almost unknown ; and opium when smoked is, as a rule, smoked by a native doctor's prescription. The opium pill-box, a tiny box of silver, is as as common in Persia as the snuff-box was once with us. Most men of forty among the upper and middle classes use it. They take from a grain to a grain and-a-half, divided into two pills, one in the afternoon and one at night, Travellers, too, almost invariably take it.

In 1871 the value of the export of opium from Persia was 696,000 rupees. In 1881 it had increased to 8,470,000 rupees, and the increase has been steady each year. Probably this increase will continue, and ultimately Indian opium will find a rival, and our revenue in India will be thus much reduced. For the Chinese market, a certain portion of oil is used in the preparation of Persian opium. The preparation of the opium for market is a very anxious time with the merchant. He has to be constantly in and out, and is obliged to pay watchers, and pay them well, to keep pilferers from his goods. The labourers engaged in the *teriak-mali* are searched on leaving, as a matter of course ; but they generally manage to add considerably to their wages by what they can purloin. This is their "cabbage," or *modakel*—a word much in use in Persia, where as a rule a man's pay is often much less than his *modakel*. A man's pay is usually known, and [illegible] common question [illegible] Persians are "What is his pay [illegible] "What is his *modakel*?" A servant's *modakel* is what he can take from the tradespeople, generally ten per cent ; a governor's *modakel* is what he can exact from the taxpayers over and above the taxes ; the Shah's *modakel* is what he can sell the governorships for ; and so on.

The manufacture of opium is rude in the extreme, and opportunities for peculation many. It has been suggested to rub the opium on a hot plate with a chocolate-making machine, but no one has tried it. Were it not for the opium-growing the king's ryots would find it hard to pay their taxes. But the indiscriminate cultivation of this valuable crop to the exclusion of cereals tends to render bread and horse-feed dearer ; and if the cultivation of the poppy continues to spread as it has done during the last twenty years, Persia will cease to be, what it is now, the cheapest place to live in the world.—*Planters' Gazette (English Paper).*

WHAT IS THIS DISEASE THAT IS COMING UPON US ?

LIKE a thief at night it steals in upon us unawares. Many persons have pains about the chest and sides, and sometimes in the back. They feel dull and sleepy ; the mouth has a bad taste, especially in the morning. A sort of sticky slime collects about the teeth. The appetite is poor. There is a feeling like a heavy load on the stomach ; sometimes a faint all-gone sensation at the pit of the stomach which food does not satisfy. The eyes are sunken, the hands and feet become cold and feel clammy. After a while a cough sets in at first dry, but after a few months it is attended with a greenish coloured expectoration. The afflicted one feels tired all the while, and sleep does not seem to afford any rest. After a time he becomes nervous, irritable, and gloomy,

Registered No. 182.]

THE

INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, JULY 11, 1885. [No. 28.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING JULY 1, 1885.]

General Remarks.—Heavy rain has fallen in Malabar and Travancore, and slight rain elsewhere in the Madras Presidency. Prospects have slightly improved in Bellary and Anantapore, and are generally fair. In Mysore rain has been general, except in Tumkoor, where more is wanted. Prospects in the province are fair. There has been heavy rain in Coorg, where prospects are good.

Several districts in the Bombay Presidency report good rain, but more is urgently wanted for sowings in most places. *Kharif* preparations continue in several districts. In the Berars and Hyderabad some rain has fallen. Rain has also fallen throughout the Central India and Rajpootana States. In the latter, *kharif* ploughing and sowing are reported to have commenced.

Rain is reported from most districts in the Punjab, and from all parts of the North-Western Provinces and Oudh. *Kharif* operations are in active progress in both provinces. In the Central Provinces good rain has fallen everywhere, except in Nimar, where more is wanted. Sowings for the *kharif* are in general progress.

Good rain has fallen throughout the Lower Provinces, except in parts of the Patna Division, where the fall has not been quite sufficient. Prospects are now generally favourable, except in Tipperah, where excessive rain and floods have caused much damage. Standing crops are doing well, and agricultural operations are progressing favourably. In Upper Assam more rain is wanted. Standing crops are doing well. Preparations for the *sali* crop are in progress. Tea is doing well in Cachar, but is backward in Dibrugurh.

In British Burmah ploughing and sowing have commenced in a few districts, but excessive rain has interfered with agriculture in Tavoy.

The public health is generally fair in most provinces; and prices are, on the whole, stationary.

Madras.—General prospects fair slightly improved in Bellary and Anantapore.

Bombay.—Good rain in several districts, but more required urgently for sowing in most places; preparations for *kharif* crops continue in several districts. Scarcity of drinking-water in two talukas of Dharwar and one of Belgaum, and of fodder in four talukas of Dharwar, one of Ahmednugger, one of Belgaum, and parts of Khandesh. Cholera generally prevalent, small-pox in parts of twelve, and fever and cattle-disease in parts of seven districts.

Bengal.—There has been general rain throughout the province again this week; in a few places only in the Patna division the rainfall is said to be not yet quite sufficient. Prospects are now generally reported to be favourable, except in Tipperah, where considerable damage has been done by excessive rain and floods; early rice, jute, sugar-cane, and other standing crops are now growing well, and cultivation of late rice is in full swing all round; in some places transplanting of *aman* seedlings has begun. Public health is generally fair, though cholera is still prevalent in some localities.

N.-W. Provinces and Oudh.—Good rain has fallen throughout the provinces, doing much good. *Kharif* operations in progress everywhere. Markets are well supplied and prices generally steady. Public health fair.

Punjab.—Rainfall almost general. Health good. *Kharif* ploughings and sowings in progress. Prices stationary.

Central Provinces.—Rain favourable everywhere, except in Nimar, where it is insufficient. Sowings progressing. Cholera continues in Chuttisgurh. Prices steady.

British Burmah.—Cholera slight in Akyab, Sandoway, Thongwa, and Shwegyin. Small-pox slight in Henzada, Kyoukphyoo, and Tharrawaddy; elsewhere public health good. Cattle-disease slight in Henzada, Prome, and Thongwa,—severe in Amherst; elsewhere health of cattle good. Rainfall seasonable.

Assam.—Weather warm. Ploughing and sowing of *dumahi* and *murali* crops not altogether finished. Common rice 10⅜ seers per rupee. Tea doing well. Four deaths from cholera reported from Hailakandi; general health good.

Mysore and Coorg.—Transplanting of paddy commenced. Prospects of season and public health good.

Berar and Hyderabad.—*Kharif* sowings progressing; fodder and water obtainable everywhere. Tanks have received no water yet. General health good. Prices—wheat 14½, coarse rice 12¾, white *jowari* 19½, yellow *jowari* 23¼, and *tur* 17 seers per current sicca rupee.

Central India States.—Health and prospects good. Weather seasonable.

Rajpootana.—Sowing commenced. Tanks and wells filling. Fever prevailing; health otherwise good. Prices stationary. Weather very hot, with high wind.

Nepal.—Transplanting of rice commenced. Cholera continues.

Letters to the Editor.

TESTS FOR TIMBER.

TO THE EDITOR.

SIR,—The following may be of use to TIMBER MERCHANT with reference to his enquiry in your issue of the 27th June:—

Cut the wood transversely, and apply a solution of iodine; if the iodine turns into a deep violet, it is a test,—

(1.) That there is starch, which is a sign that the wood is good.

(2.) That it was felled in winter.

But if the solution be colorless, it proves that there is sap, which denotes that the wood was felled in summer.

W. B. G.

Allahabad, July 4, 1885.

COCOANUT BORERS.

I.

TO THE EDITOR.

SIR,—Will you or any of your readers kindly suggest a remedy for the destruction of cocoanut borers? Many of the agriculturists of Southern India will be under great obligation to Baboo Hem Chunder Dutt if he can give the vernacular names for "cowhage."*

AN ENQUIRER.

Soolakera Estate, Mysore Province, June 21, 1885.

* NOTE.—For an answer to this query, we wo[illegible] correspondent to the *Indian Agriculturist* of the 16th May 1885, page [illegible]. ED., *I. A.*

II.

TO THE EDITOR.

SIR,—In reply to your correspondent AN ENQUIRER, I would suggest the following methods for the destruction of cocoanut borers:—

1. If the fruits are attacked while on the tree, take equal parts of fresh lime or chunam and salt, well mixed together, and sprinkle on the ground round the roots of the trees, taking care to loosen the soil for a couple of inches previous to applying the mixture. Having done this, water regularly for three days, and then manure the tree by throwing round its roots 2 or 3 baskets full of coal-ashes.

2 If the borers injure seedlings, then take some fresh lime and mix it with water; then sprinkle the lime in its quick state upon the land that is overrun with this pest, at the rate of 10 gallons per biggah. The lime should be sprinkled towards the wind, as, falling upon them in a heated state, will instantly drive out borers, ants, beetles, vermin, mites, &c.

3. If the borers injure or damage cocoanuts kept in stacks in barns, then put a large quantity of wild-vine or hedge plants upon the stacks. The offensive smell of this plant is a certain remedy for borers. It may be added that if a handful of rice by any chance gets mixed with the cocoanuts kept in stacks, they will all be damaged.

HEM CHUNDRA DUTTA.

Rughoo Nath Chatterjee's-street,
Malakar's Cottage, July 4, 1885.

MITES, &c., IN RICE.

I.

TO THE EDITOR.

SIR,—I am thankful to your able correspondent, Baboo Hem Chundra Dutta, for the recipe he recommended for the destruction of rank grass, weeds, &c., &c., and fertilizing soil so that it may become sharp, porous and friable. It is needless to say that his method proved successful, and I believe that if any one, like myself, tried Baboo Hem Chundra's method, he would concur with me.

Having been benefitted thus by you, I take the liberty of asking you another important question, and hope that either you, or any of your numerous correspondents, will kindly enlighten me on the subject. Lately I stacked a quantity of rice in my small barn, and took every precaution to secure it from the attacks of mites, mice, &c., but to my misfortune, within four months most part of my rice was destroyed by these pests. What should I do to guard against these pests?

ANOTHER FLORIST.

Calcutta, July 6, 1885.

II.

TO THE EDITOR.

SIR,—I would recommend ANOTHER FLORIST to adopt the following simple method to keep his rice barn free from the ravages of the pests he complains of, and would be glad to know the result through the medium of your valuable paper:—Mix the rice, either *ahtub* or *seedho*, with a small quantity of dry *chunam* before storing it in the barn, and round the base of the stack sprinkle fine, white, dry sand (proportionately according to the quantity of rice) before the thatch is put on. This will, I think, secure rice from the depredations of rats, mites, weevils, &c., for more than 6 years without the least alteration, either by humidity or fermentation.

HEM CHUNDRA DUTTA.

Calcutta, July 7, 1885.

Editorial Notes.

WE invite attention to a paper bearing the title of *The Opium Traffic*, which will be found elsewhere. It is an important subject, and has [illegible]ly dealt with.

⁂

IN the first two months of the current financial year, the Assay value of coins and bullion received in the Indian Mints, has been Rs. 2,30,95,578, and of those coined and examined Rs. 2,18,98,237. Of this latter sum, the Calcutta Mint coined Rs. 76,42,657, and the Bombay Mint, Rs. 1,42,55,580.

⁂

THE little Deoghur Railway shews rapid progress. The traffic of the last half-year compares with that of the corresponding six months in 1884, as follows:—

	1884.	1885.
Passengers ...	77,380	104,803

The goods traffic by the line is trifling in amount, as it is essentially a passenger line. The total receipts of the last six months were Rs. 13,982, against Rs. 10,807 for the same period last year. We congratulate the shareholders, and Messrs. Burn and Co., the managers, on these results.

⁂

WE print elsewhere an interesting paper on the destruction of locusts in the little Island of Cyprus. The ravages of this pest in India are too well-known to need comment. Miss Gordon Cumming's paper shows what can be done by vigorous and determined measures, carried out thoroughly and systematically, and that it is even possible to exterminate such a plague as the locust. We commend this paper to the earnest consideration of our Indian local and district officials. We would, at the same time, suggest to the Government of India the advisability of circulating this paper far and wide, with a view to the adoption of some such measures in India.

⁂

MOST people will admit that it is rather difficult to keep agricultural implements with polished surfaces free from rust, particularly during the rainy season. An American contemporary says that the following preparation applied to the surface will prevent any rusting on ploughs, or any other metal surfaces which it is desirable to keep clean, polished, and free from rust: Melt one ounce of resin in a gill of linseed oil, and while hot, mix with two quarts of kerosine oil. This can be kept on hand, and applied in a moment with a brush or rag to the metal surface of any tool that is not going to be used for a few days, thus preventing any rust, and saving much vexation when the time comes to use it again.

⁂

AN effort is being made to prove that the assembly of the ryots at Jhingergacha had no real significance, and no importance. We suspect that this effort springs from some jealousy of the *Amrita Bazar Patrika*, which is supposed to have promoted the meeting, on the part of the *Sanjivani*, which claims to be the true organ of the ryots. If this is so, it is certainly very foolish. The *Sanjivani* reporters being hostile, affirm that there were but 5,000 ryots at the meeting, and that these were drawn there by the fact that the *Pagla Kanie* 'bard' was to be present, and that the ryots had no work to do on account of the *Amba bache* ceremony, whatever that may be. The statement that the meeting was instigated by the zemindars, we believe to be absolutely untrue.

⁂

THE fall in the present price of silk is reported to be lower than at any time since the French Revolution of 1848. This, in a great measure, is due to the enormous imports from China during the present year; and, as a natural result, the English silk market is glutted. Some idea of this may be gathered from the fact that during the last eleven months of 1884, the imports of China Silk had reached 30,698 bales, compared with 12,789 bales in the corresponding period of 1883. The reason for this is not far to seek. The Chinese dealers and merchants were, very naturally, in great fear of damage being done to them and their goods by the French on the one side, and of internal exactions on the other; while the plunder to follow by third parties in a time of panic, urged them to prefer to sell off their stocks at low prices. The present stocks of China silk in the London markets amount to 28,000 bales, valued at nearly two millions Sterling.

⁂

A CORRESPONDENT of the *Statesman*, referring to the article on the Mango, which recently appeared in these pages, says:—"All lovers of this most delicious fruit would do well to follow the advice of the learned writer [Dr. E. Bonavia.] Mangoes, if properly and scientifically cultivated, will no doubt become a source of income to the country. But there is one very great drawback to the regular and successful cultivation of them in the districts of Backergunge, Furreedpore, Jessore, and the eastern portions of the district of the 24-Pergunnahs. A kind of insect allied to the common beetle is found in our mangoes, and makes them totally unfit for the table. It is believed that the larvæ of these insects are deposited by the mother in the unripe fruits. They are thus furnished with a shelter, and food for their support, and when fully developed cut their way out of the fruit. Even the best imported mangoes are liable to their ravages. Can the learned writer of the article above referred to, or any one of your numerous readers, suggest a remedy for this evil?"

⁂

ONE of the conclusions reached by Dr. Lazenby, director of the Ohio Experiment Station, as the result of two years' experiments with corn, says the *Farmers' Review*, is that deep cultivation should come before planting, rather than after, and that the after culture should be more and more shallow as the corn increases in size and the roots more completely fill the soil. This fully accords with our experience and teaching. We have found deep culture late in the season (tried as an experiment) to cause the corn to so droop that it did not recover visibly from its effects for a week. The harrow is the implement for use in the corn field, from planting till six inches high. The cultivator can then be run deep, if desired, once or twice. But all subsequent cultivation should only stir the surface without mutilating the roots. This is especially true in a dry season.

⁂

We learn that Mr. Ozanne, Director of Agriculture, Bombay, lately reported to the Bombay Government, that "arrowroot from Bermuda seed has been grown and manufactured in the Rutinagherry District, by Mr. Narayan Ramchandra Gogate, a resident of Dapoli. He has brought me samples of the prepared arrowroot. He has shown me a certificate from Mr. D. S. Kemp, to the effect that the 'sample is the species known as Bermuda arrowroot,' and another from Dr. Anna Moreshwar Kunte, Demonstrator of Anatomy, Grant Medical College, to the same effect, but with the addition—'I am glad to find that it is equal in all respects to the best species of arrowroot available.' Mr. Gogate has been five years experimenting with the production, and has now obtained a crop of 350 lbs. of prepared arrowroot, and has put down enough land this year to produce 3,000 lbs. The best arrowroot sells in the shops from Re. 1-4 to Re. 1-12 per lb. Mr. Gogate is willing to sell the 200 lbs. he has now in stock at 12 annas per lb. He will undertake to supply next year 3,000 lbs. at the rate of 8 annas. He has reasonable hope of reducing the price if he can succeed in procuring better appliances for its manufacture." The Government sent a sample of the arrowroot, to the Chemical Examiner, for analysis. Dr. Lyon reports :—"I have examined the arrowroot, and find the same to be of the description known as Maranta, or West Indian arrowroot, and to be free from adulteration, and of good quality."

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The Lahore paper makes the following very appropriate remarks on the subject of Indian Cottons :—"Indian cottons, which are, much more than American, liable to variation, rottenness of staple, and 'fluffiness'—which means waste—are viewed with particular suspicion on 'The Flags' at Liverpool, and for this, those engaged in the trade are chiefly to blame. How can this suspicion be removed and confidence restored? To this, we would answer somewhat as follows: Avoid small consignments, and let cottons be judiciously mixed; the keeping of the resultant mixture always at a standard being the one end kept in view. If Indian shippers would combine and, instead of sending home small lots of cotton which are never liked by the English spinner, however small he may be, let them be mixed down into larger consignments of, say 1,000 bales, let them be well, but not over, ginned; let them be free from dirt and regular in quality; and let the greatest care be taken that the second shipment shall correspond, as nearly as possible, in quality and *character*, to the first; the third to the second, and so on; and we are convinced that in a short time the cotton shipped under this mark, whatever it may be, will always fetch its full value in the home markets—because spinners will have confidence in buying it. A word, in conclusion, to Indian spinners. Realize the fact that Indian cottons are unsuited for the finer classes of goods, and if you wish for comfortable profits, spin 'Low Numbers' and manufacture 'Coarse Cloths.' Attend more to packing and mixing, and be very careful that the men who have charge of the mixings know cotton thoroughly."

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In the districts of the Madras Presidency there were 73,237 births in November, and 69,858 in December, 1884. The deaths registered during the same period numbered 59,977 and 86,313, respectively. More than one-half the deaths occurred from cholera. In the municipalities there were 4,847 and 4,093 births during the months of November and December, respectively, and 4,749 and 6,491 deaths. Of the sexes born, there were, during the two months for both town and country, 72,381 boys and 69,914 girls, the former exceeding the latter by 3·5 per cent, or 100 girls for every 103·5 boys. The mortality was also greater among the males, being 75,000 males to 71,290 females, or in the proportion of 105·2 of the former to 100 of the latter. The ratio of total births to population was, including districts and municipalities, 31·5 per mille, per annum, in November, and 29·9 in December. The death-rates were 25·8 and 37·4, respectively. The mortality, as compared with the ratios for Bengal, N.-W. Provinces, and the Punjab, for the same periods, is as follows :—

	Death-rate per mille per annum.	
	November.	December.
Bengal	27·4	26·2
North-West Provinces	42·1	32·2
Punjab	60·0	39·5
Madras	25·8	37·4

In this respect the Madras and Bengal Presidencies compare most favourably with the N.-W. Provinces and the Punjab, where one would expect the mortality to be very low.

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As curtailment of public expenditure is the order of the day, the Madras Government, in compliance with the wishes of the Supreme Government, have ordered reductions to the extent of Rs. 24,61,393. The following are the details of the reductions :—Land revenue reorganization establishments held over, 4½ lakhs; Saidapet farm closed, Rs 7,670; Revenue Settlement Department reduction, Rs 16,654, Survey Department reduction, Rs. 75,000; Salt, 3½ lakhs; Forest, 1 lakh; Marine Department, proposed purchase of steamer abandoned, Rs. 1,15,000; Scientific and Minor Departments, Public Exhibitions and Fairs, Rs. 16,000; Cinchona Plantations, Rs. 10,000; Protective Works, Irrigation, Godaveri and Kistna Deltas and Sangam Anicut, 4 lakhs; South India Railway, Rs. 48,480; Minor Irrigation Repairs, 2 lakhs; Military Works, Rs. 2,77,006; Postal and Telegraph, Rs 11,200; Provincial Public Works, Rs. 2,91,053; Board of Revenue, Rs. 37,000; Vizagapatam Agency, Rs. 18,830; Churches and Cemeteries, Rs. 7,000; Army, Rs. 30,500—total, Rs. 24,61,393.

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Our Lahore contemporary, writing on the subject of the Indian Coal supply, says :—"By no means the least important chapter in Colonel Stanton's last report, is that relating to mineral resources, more especially is it important to this Province, where the fuel question is every year literally becoming a more looming one. Wood is everywhere growing scarcer and scarcer, and as our railways extend, the provision of some practical substitute is more imperative. Anything in the shape even of the most inferior coal would be invaluable, and we are glad to notice that the further coal explorations in the Salt Range near Pind Dadun Khan, commenced last year, have yielded more favourable results than [illegible]. Eighteen out-crops gave total length of exposed coal seam [illegible] of two miles, the average thickness of which was reported as 15 inches. The total area of limestone which overlies the coal, is 125 square miles, and if under only a small portion of this there is coal of useable quality, and that can be got at reasonable expense, the results would no doubt be of the greatest value. Two places have been selected for further trial operations—Chittidand and Dandot. An experimental drift at the former is said to have yielded coal 30 inches thick, which promises to continue; at the latter also, a coal seam of 30 inches has been found in one drift, and experimental borings to examine the extent of the field are in progress. We must confess to being somewhat sceptical as to the results.

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A correspondent, writing to the *Gardener's Monthly*, cites the following curious instance of trees growing through a tombstone :—"With a friend of mine, I visited a place called Lucien, in Hertfordshire, about eighteen miles from London, to see, as was said, 'the greatest curiosity ever heard tell of,' situated in Lucien churchyard. There we saw seven ash and three sycamore trees growing through a tombstone out of a grave. The stone was about twelve feet long, six inches thick, and eight feet wide. The growth of the trees had split the stone in all directions. Some of the trees at that time were seven inches through, and about fifteen feet high. The grave lot was enclosed with an iron fence twelve feet high, and the branches of the trees and some parts of the trunk had grown into the fence in all imaginable shapes and forms. Of course, there is a 'true story' connected with the circumstance, as the people of Hertfordshire will strongly affirm. The person buried in this grave was a lady of title, Lady Anne Grimstone, who was buried there somewhere about a hundred years ago. She was an unbeliever in a Supreme Being—in fact, an infidel—and those who doubt it can buy a book, sold by pedlars for six-pence, strongly confirming the horrible story in detail. This lady asseverated previous to her death, that if there be a God or devil, a heaven or hell, she hoped ash and sycamore trees might grow through her body. No one planted these trees there, and the people religiously believe that, to prove to the living the horrible heresy of the dead, the trees came from her body, and the more to attract attention, have grown up through and broken the stone."

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A CORRESPONDENT writes to us privately: "Agricultural Europe is being ruined, and industrial Europe with it in a measure, through the operation of the mono-metallic fallacy. And England suffers first and most. One noticeable result of the struggle for gold is, that England cannot retain hers when other markets want it, and it requires a high Bank of England rate, higher than is warranted by trade, to turn the stream. This was very clearly demonstrated last November, when New York, where money was begging employment at 2 per cent, still could take gold, though the Bank of England rate had been advanced to 5 to check exportation. Trade of course had to suffer, and should the gold craze continue, the bank rate will require to be permanently raised to a protective level, without regard to the demands of England's own trade."

This forecast we believe to be absolutely true, and it is as unfortunate as it is remarkable, that the chief commercial nation of the world should be behind so many others, in its discernment of the state of things. The world is to-day exactly in the same position in which it was throughout the first half of the present century. Its commerce and industry are held in bonds, by the want of a sufficient medium of exchange. Prices are everywhere slowly receding as they did then, without men knowing why, and it was not until long after the discovery of the gold fields, that the cause was clearly discerned. The same evil of an unduly restricted medium of exchange has overtaken us since the year 1872-73, when the demonetization of silver by Germany, and the action of the Latin States, began greatly to intensify the evil.

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THE following is the official summary of the reports of the the Revenue and Agricultural Department, on the state of the [illegible] prospects of the crops throughout India, for the week ending 1st July:—Heavy rain has fallen in Malabar and Travancore, and slight rain elsewhere in the Madras Presidency. Prospects have slightly improved in Bellary and Anantapore, and are generally fair. In Mysore rain has been general, except in Tumkur, where more is wanted. Prospects in the province are fair. There has been heavy rain in Coorg, where prospects are good. Several districts in the Bombay Presidency report good rain, but more is urgently wanted for sowings in most places. *Kharif* preparations continue in several districts. In the Berars and Hyderabad some rain has fallen. Rain has also fallen throughout the Central India Rajpootana States. In the latter *kharif* ploughing and sowing are reported to have commenced. Rain is reported from most districts in the Punjab, and from all parts of the North-Western Provinces and Oudh. *Kharif* operations are in active progress in both Provinces. In the Central Provinces good rain has fallen everywhere, except in Nimar, where more is wanted. Sowings for the *kharif* are in general progress. Good rain has fallen throughout the Lower Provinces, except in parts of the Patna Division, where the fall has not been quite sufficient. Prospects are now generally favourable, except in Tipperah, where excessive rain and floods have caused much damage. Standing crops are doing well, and agricultural operations are progressing favourably. In Upper Assam more rain is wanted. Standing crops are doing well. Preparations for the *sali* crop are in progress. Tea is doing well in Cachar, but is backward in Dibroogurh. In British Burmah ploughing and sowing have commenced in a few districts, but excessive rain has interfered with agriculture in Tavoy. The public health is generally fair in most Provinces; and prices are, on the whole, stationary.

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IN accordance with the orders of the Punjab Government, it has been arranged that the usual annual returns relating to manufactures, which form a portion of the annual report on the internal trade of the province, should be discontinued, and that instead, a separate report should each year be prepared of some particular manufacture. The result has been an admirable monograph on the cotton industry of the province, which has just been issued by the local Secretariat. The area of land on which cotton was cultivated in the Punjab for the last four years, was shown, in the Revenue Administration reports as follows:—

	Acres.
1879-80	777,041
1880-81	785,834
1881-82	890,037
1882-83	830,631

Referring to the cotton reports of the same years, there seem to be some discrepancies in the figures shown. This is accounted for by the exclusion in some cases, and inclusion in others, of lands which were sown with cotton, but of which the crop failed to come to maturity. After making all allowances however, it may be presumed that the average extent of land under cotton in the Punjab is somewhat over 800,000 acres, and that there is a tendency to increase. The outturn per acre of cleaned cotton was shown in the last three reports as 96lbs. and 103lbs. The total yield of the province is as follows:—

	Cwts.
1879-80	644,483
1880-81	653,917
1881-82	789,581
1882-83	804,917

giving an average of 722,724 cwts., or 1,011,815 maunds annually. The excess of exports of raw cotton from the province over imports into it from other provinces, was shown to amount on the average to about 110,000 cwts. a year or 154,000 maunds. The cotton exported is sent to Calcutta, Bombay, and Kurrachee in nearly equal quantities, and on the average about 9,000 maunds are exported to foreign countries beyond the northern and western frontiers. The average exports from the province by rail and river, from 1880-81 to 1883-84, were 137,384 maunds, and the average imports from other provinces were 22,926 maunds. It thus appears that 857,000 maunds of raw cotton, or 84 per cent of the whole yield of the province, is locally consumed.

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IMMIGRATION from India to the several colonies, although it has increased of late years, has not taken a popular hold of the people. Almost in every case, the demand has very largely exceeded the supply. This fact is borne out by the Indian Immigration Report for 1883, relating to the Island of Fiji. In it we find that the demand and supply for adults during the two years, 1882 and 1883, were as follows:—

	Applied for	Supplied.
1882	1,200	901
1888	1,678	896

During the season of 1883, two ships, carrying 1,017 of all denominations, sailed from Calcutta, and of this number 992 landed at Fiji. There were 4 births and 29 deaths at sea. The mortality at sea during the past three seasons, from 1881 to 1883, ranged between 17·15, 20·19, and 17·75 per cent. The proportion of females to males of all ages was 41·34 and 40·81 in the two vessels, respectively. This is very nearly in accordance with the authorised standard of 40 females to every 100 males. The rate of mortality on plantations, amongst indentured immigrants, during 1883, was 3·16 per 100, which is very much in excess of that for the preceding year, viz., 1·93. The reason given for this is that the immigrants by the *Poona* were less hardy or healthy, than those despatched in other vessels. This can, however, scarcely be taken as a valid reason. The fact is, that cholera broke out on board the ship, resulting in 14 deaths. There was a total of 2,349 Indian immigrants resident on the plantations during 1883. Of these 39 had died. It is stated that the mortality amongst the coolies, serving on large alluvial flats fringing the course of rivers, was higher than amongst those situated in non-alluvial tracts. This is a curious fact, and it would be interesting to know the cause of it. It is also stated that a very general desire has been evinced by many free coolies to take up land and settle in the country, but that no facilities have as yet been offered to them for the acquirement of land. We cannot understand why these facilities have been withheld. It is obviously of advantage to encourage such a desire, as the cost to an employer of introducing an immigrant ranges between £15 and £21. A peculiar feature of the present report is, that applications for Indian immigrants were almost entirely confined to recent settlers in the colony; the earlier colonists clinging with extraordinary tenacity to labourers from Polynesia. There is no apparent reason for this, as a Polynesian immigrant costs more to import, and is more liable to sickness, than the Indian; while the cost of his return passage falls on the employer instead of on the public revenues, and his natural food, on which only he will thrive, has to be imported, and cannot be kept for any length of time. Besides this, his indenture is only for three years, and he rarely engages on the same plantation after expiration of his agreement. In fact, all the advantages are on the side of the Indian immigrant. The rainfall in Fiji is very heavy. In one place it rained 231 days in the year, in another 170 days, and a third 185 days, giving a total rain-fall in each, respectively, of 123·14, 154·91, and 76·44 inches. This to a certain extent, accounts for the low average, number of days worked by coolies. Money to the amount of £1,242 was placed in deposit by 72 immigrants in the banks at various periods. One hundred letters were despatched to India free of charge. Altogether, the report bears testimony to the general well-being of the indentured Indian immigrants throughout the colony. This question of immigration is one of considerable importance, and too much attention cannot be devoted to the comforts and interests of those who leave their native land to labour in our colonies.

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Mr. Ribbentrop, the officiating Inspector-General of Forests, complains, and we think with truth, that several of the local Governments were, for some reason or other, not able to secure candidates for their forest service, of a sufficiently advanced education, to enable them to follow the forest ranger's course. To meet this difficulty, however, a vernacular class was established during the year in which a somewhat more elementary education can be acquired by students who have not a knowledge of English. The course of the Forest Rangers' class extends now over 18 months, and is arranged somewhat as follows: Theoretical instruction is given from the 1st July to the 31st October, in vegetable physiology (including the structure of wood), elements of physics and chemistry, mathematics, surveying, road-making, and building. This is followed up by a two-months' practical course in surveying, which is found sufficient to pass the students for the lower standard. From January to June the students are taught sylviculture in all its branches, in theory and practice, and in this respect the greatest progress has been made during the year by means of the (already mentioned) appointment of a special teacher. Formerly, when no special instructor was available, the students were distributed amongst selected Forest divisions for a course of training in practical sylviculture; but it was found, as might have been expected, that the officers in charge of divisions had but rarely the leisure for special instruction of students, and not often the inclination. The present arrangement, however, obviates this. In July of the second year, a purely theoretical course of instruction begins, extending up to 31st December, and includes forest working plans and utilization, systematic forest botany, elements of mineralogy, and geology, forest law, elements of etiology, and mathematics. This arrangement is the outcome of frequent discussions and consultations, and is said to be thoroughly practical and to work well. The Vernacular class extends over twelve months only. The instruction is much the same as that imparted by the English class, though of a more elementary nature, being based more on a rule of thumb, whereas the Rangers' class embraces the theory of each subject taught.

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The staff of teachers employed during the year was composed wholly of able Forest officers, nine in number, each one taking up a separate subject. Three Gazetted officers attended the school for the theoretical part of the course, from 1st July to 31st October. The second year's class was attended by nineteen students. Of these, one resigned, one was granted a Forester's certificate only, three were put back a year, and fourteen obtained a Ranger's certificate, which was granted with honors to two of them. The first year's Rangers' class was attended by only eleven Government students (one of whom has since resigned), one probationer, and seven students sent from Native States. The Foresters' class was attended by five students, all of whom belong to the North-Western Provinces. It is satisfactory to note that the number of students sent from Madras and from Native States has increased so much. Mr. Ribbentrop concludes his report with the following significant remark:—"Conservators of all provinces, who have given a somewhat more extensive trial to the education afforded at the Forest School, have expressed it as their decided opinion that the passed students of the school are, as a rule, markedly superior to their untrained compeers; and it is, therefore, all the more to be regretted that the Central Provinces, Bengal, and Assam have not sent students to Dehra, and that some of the other provinces do not make a more extensive use of the establishment." The expenses of the school amounted during the year to Rs. 22,934. The Government of India, in summing up the report, recorded the following order:—"It has been recognized as the policy of the Government in forest organization, that the forest range shall ultimately form the working unit of Forest administration; and it is necessary, therefore, in order to keep pace with the gradual expansion of the department, to provide an efficient staff for these subordinate duties. Experience has shown that rangers who have passed through a professional course of training at the school have, on return to their province, been found to possess a better knowledge of their duties than untrained men. It is matter of regret, therefore, that some provinces have not as yet sufficiently availed themselves of the advantages to be derived from the school. The Governor-General in Council trusts that local Governments will once more instruct Conservators of Forests to use their utmost endeavours to select and secure suitable candidates for training at the school. Divisional Forest officers and Deputy Commissioners, who have better opportunities of knowing the capabilities of the members of the local subordinate staff, might also, with advantage, be asked to assist Conservators in this respect."

PLOUGHS AND PLOUGHING, BURMAH.

[*By Mr. F. W. Cabaniss, Assistant Director of Agriculture, British Burmah.*]

So far as the writer of this note has been able to judge, after an experience of eight years' intimate connection with the cultivation of the soil in Bengal, North-Western Provinces, and British Burmah, the failure to introduce successfully improved useful agricultural implements, from Europe and America, into India, has been largely due to two causes, namely—

(i) That the requirements of the country were not known;

(ii) That the art of working the implement introduced was not understood by the party to whom it was sent to instruct the cultivator in its use.

Often has it been the case that the instructor has been unable to use the new implement, as well as the cultivator used his crude home-made implement, the art of which crude implement the instructor himself [illegible] ignorant of. Often have I seen in official reports from the [illegible]cials, that the cultivators said this or that about the new implement, giving some imaginary defect that the district official could not explain away; or it might be, that the implement was not being properly worked; or, yet again, the implement might have been tried for some work for which it was never intended and entirely unsuited, all of which the instructor was ignorant of. This cannot be complained of. The district official had never before had occasion to learn the use of any agricultural implement, and yet he was the best available instructor to whom Government could entrust it for practical trial. With these facts before you, are you surprised that so many useless implements have been tried, and also so little favour has been shown by cultivators for really useful implements? The wish that others may benefit by my experience, which I have learned from hard, practical tests, has induced me to state the following facts, that they may be of service to those who take an interest in the cultivation of the soil.

America appears to me to be the country to which we here in the East must look for improvements in agriculture and agricultural implements, owing to its geographical situation, to the interest taken in agriculture, and to the tendency of its people to cultivate the soil as cheaply as possible by the use of the best machinery and implements. For both America and India the best implement that I have seen, to commence cultivation with, is the *turn-plough*. The turn-plough is a plough that turns the soil to one side, and either inverts, or partially inverts, the soil. The top and the bottom of the furrow is about the same width. If the soil is entirely inverted, hard rain will cause it to run together and become hard again earlier than if it was partially turned. If there is grass on the surface, and seed will be sown in a short time, it is best to turn the soil over completely and thus destroy the grass. For improving the soil cheaply, a crop sown on it and then turned under the soil, while green, is ordinarily the best mode. This the turn-plough will do with any kind of plants that will bend easily, such as rice, jute, indigo, &c., without the plants being cut, even if they are four or five feet high. To do this, attach a heavy chain from the beam of the plough to the handle so as to bend the crop in the direction in which the plough is going. Land ploughed with a turn-plough, and left so, will be dried by the sun's rays much more quickly than if ploughed with a plough that does not invert the soil. The *Watt* turn-plough is the best plough that I have yet seen for general ploughing. The *Shovel* plough is shaped like a pointed shovel and throws the earth both sides. Its furrow is much broader at the top than at the bottom. It is used to re-plough land, and also to cultivate between the rows of a crop that is planted in lines. Its draught is very heavy, considering the amount of earth cut. It is therefore unsuited to commence preparation of the soil with. The *Trowel hoe*, or sub-soil plough, does not turn or throw the earth. It is trowel-shaped, with a stanchion handle placed at right angles to the share, or trowel, and is used for aerating the roots of plants and stirring the soil when there is no grass. It is scarcely used at all now. The *Drag, or Harrow*, is a frame containing a number of teeth, and is used for pulverizing the soil after it has been ploughed with the turn-plough, and also for cultivating a growing crop. It may contain any number of teeth in proportion to the size of the frame.

The cheapest preparation of the soil that I can recommend is, if the land is in ploughing condition, and not foul, plough once with a turn-plough, harrow once with a harrow, and then pass a trough-shaped beam (trough side down) over the surface of the field. The soil then will be in a condition to be seeded with almost any kind of seed. It will always be well to remember—

(i) That land ploughed with a turn-plough has a tendency to dry rapidly;

(ii) that land entirely turned with a turn-plough will become hard again much more quickly, if entirely inverted, than if partially inverted;

(iii) that land ploughed with a shovel-shaped plough, if it is a rolling (hilly) surface, has a tendency to cause the soil to wash away;

(iv) that ploughing [illegible] trowel-hoe plough tends to prevent [illegible] washing, and it will also retain moisture longer than if cultivated with any other implement.

For rice-cultivation in Burmah.—At present I would recommend that the land be ploughed once at the beginning of the rains with the turn-plough, entirely inverting the soil, and that afterwards it be ploughed, when necessary, with the usual Burmese implement; and just before planting or sowing, a log of the afore-mentioned trough-shaped implement be passed over the field.

For kaing-cultivation.—Plough once with the turn-plough just before the end of the rains, entirely inverting the soil, and afterwards cultivate with the usual Burmese implement when the land is dry enough to be prepared. Pass the log or trough (hingher[*]) shaped implement over the field, and it is ready to be sown or planted with any kind of seed or plants grown in kaing-cultivation in Burma.

In connection with ploughing, it may not be out of place for me to mention here that *hot sunshine* is injurious to the soil. Land therefore that has any protection, or anything on it to shade it, should not be ploughed until the last moment. For instance, rice-fields in Burmah should not have the stubble burnt on them until just before the rains. After the rains commence, the sun's rays are obscured by the clouds and they have little effect on the soil. If the stubble is not burnt at all, but left on the land and ploughed into the soil, the field will improve, but the crop that season will not be as good as if it had been burnt, because the stubble will not have decayed in time to be used as plant food that season, whereas the ashes would be taken up at once by the young plants.

In America, during the winter season, like the rains in Burmah, the sun's rays are very weak, so ploughing is done during the winter for spring sowings, but never during the summer until the last moment for autumn sowings. To illustrate this, wheat is sown often on fallow land about the 1st October. Vegetation in America is at its best growth during June and July, and in making a fallow your idea is to put as much vegetation into the soil as possible, and you also wish to have this vegetation sufficiently decayed at the time of sowing to be available as plant food. With these two objects in view, you would be inclined to plough in June or July, and take vegetation at its highest, and also have more time for it to decay. Experiments have, however, proven that these two advantages are more than counterbalanced by the damaging effect of the sun during June and July, and the best time to fallow is during the month of August. In the North-Western Provinces of India I recommended that land be ploughed before the dry season, and remain so during the hot season, because during the dry season there no protection of any kind on the surface of the fields; stubble being carried away for fuel, and the ground being dry for grass to germinate at that season of the year. My reason for recommending this was that the sun has more effect on a hard, compact soil, than on a light, porous one.

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[*] This instrument is called hingher in Bengal and the North-Western Provinces, sara-un in Oudh, and kyandon in Burmah.

RE-SETTLEMENT OF THE CENTRAL PROVINCES.

We understand that Mr. Crosthwaite goes up to Simla next month, to discuss with the Government of India the arrangements to be made for the re-settlement of the Central Provinces, which are now within measurable distance of us. Under ordinary circumstances, we should not hesitate to recommend that the rates should be revised simply upon the *putwaris'* records, but the settlement of these Provinces is a solecism in the history of our administration of the land revenue. The settlement was made during one of those periods of reaction which have been so frequent in India, and in which all considerations of prudence and of the State necessities, have been over-borne by wild proposals to recast the fiscal system of the country upon such notions as those propagated by Sir Richard Temple, that we had only to abandon the land revenue of the country, to find the Treasury overflowing with the yield of the custom house and the excise office. It was under this preposterous notion that the settlement of the Central Provinces was made, and the State share in the produce of the soil fixed for thirty years at an average of 8 or 9 annas per acre. The effect has been to hang these provinces like a mill-stone round the neck of all the others for the last thirty years. By the time the present settlements expire, these Provinces will have been allowed practically to lay the rest of India under a tribute of nearly thirty millions sterling, to defray their proper share of the general burdens. We have no doubt that Mr. Crosthwaite is as well aware of this as ourselves, and as no re-settlement of the Provinces can be made that does not very materially enhance the weight of the assessments, he may possibly think it absolutely necessary to re-survey the land. Under ordinary circumstances, we should desire to see the new assessments fixed and the new leases issued, upon the strength of the *putwaris'* records, without a re-survey. This would be of course the cheapest plan, and the least troublesome to the people, but the fact must be recognised at the outset, that *the assessments will have to be doubled.* They were pitched at rates that were insane, and that moreover at the very time when the State was constructing two most costly lines of railway throughout them: the line to Nagpore and the line *viâ* Jubbulpore to Allahabad. Were an interprovincial balance-sheet made out for the last thirty years, as it ought to be, the Central Provinces would be seen to have an arrear debt standing against them of 20 to 30 millions sterling, and to permit this state of matters to be stereotyped is impossible. We recognize the invidiousness of speaking of "doubling the impost," but we are speaking of what is absolutely necessary. If the Chief Commissioner of the Provinces and his district executive think it possible to increase the rates to this extent *without* a re-survey, well and good; but what must be absolutely resisted is any attempt to maintain the existing rates of assessment, or rates at all resembling them. For such rates mean either State bankruptcy, or the continuance of such injustice as we are perpetrating towards Burmah, Oudh, and other provinces. The Central Provinces have fallen short by nearly a million sterling a year of their proper contribution to the Imperial burdens, and the wrong has lasted far too long already, and must be brought to an end.

Whatever step is taken, we trust the mistake will not be made of again fixing the rates for so long a period as thirty years. If a new survey is to be made at all, it must be the final one, and the assessments should not be fixed for a longer period than ten years. With everything in a state of flux around us, and the value of money changing incessantly and always in one direction, the State must reserve power to itself to revise the rates every ten years. This does not mean that they must necessarily be raised every ten years, but that the survey work being once properly completed, the rates shall be liable to increase at intervals of ten years, upon a mere Notification in the *Gazette of India*. We are approaching a crisis on this question of the land revenue, and it will not do to meet it with our eyes closed. The enormous expenditure already made, and yet contemplated upon railway extension; the fall in the value of money; and the monstrous inequalities which mark the present assessments, must be borne fully in mind. We have no desire whatever to see the Central Provinces re-surveyed, if the work is needless and the village records of the *putwari* can safely be made the basis of a new settlement of the assessments; but the Government must start with the full understanding that the present rates have been a gigantic injustice and folly, to be repeated no more in the country anywhere.

OUR CINCHONA PLANTATIONS.

The resolution of the Local Government on the Annual Report of the Government Cinchona plantations in Bengal, for 1884-85, brings to light some interesting facts. The total number of trees of all kinds on the plantations, at the close of the year, was no less than 4,912,111, divided as follows:—

Red (*Succirubra*)	3,232,000
Yellow (*Calisaya Ledgeriana*)	1,086,118
Yellow (*Verde and Morada*)	183,300
Hybrid	385,100
Other kinds	25,593

The yield of dry bark during the year amounted to 339,201lbs, of which 325,125lbs. were red, and 14,076lbs. yellow; the whole of this bark, with the exception of a small quantity, was made over as usual to the Febrifuge Factory for disposal. The quinine yielding varieties are those known as *Calisaya*, *Verde*, and *Morada*, of which 174,800 trees were added to the plantation during the year. These trees were raised from seed supplied in 1882-83 by the Secretary of State. These varieties are known in Bolivia to produce some of the finest yellow bark of commerce. But whether they are likely to be as successful in India is yet to be seen. It may, however, be hoped that they will, as their present appearance is reported to be healthy. The rich yellow variety, known as *Ledgeriana*, has also been extensively cultivated, no less than 231,900 trees having been planted out; while the hybrid varieties were increased by 84,600 plants. It is therefore evident that a considerable advance has been made in substituting quinine-producing sorts for those yielding the less valuable alkaloids. Dr. King, under whose able supervision the plantations are placed, again notices the continued failure of the Carthagena bark, and is of opinion that it will never be successfully grown in Sikhim. A quantity of *Romija* seed, which produces a quinine-yielding bark, known as *Ouproa*, was obtained from South America, from which some 40 seedlings were raised; but the young plants are said not to look altogether healthy, and it is feared that the climate of Sikhim will not suit their growth.

The expenditure of the plantation amounted to Rs. 81,727, against the budget allotment of Rs. 97,805, thus showing a saving of Rs. 16,078. Rs. 12,480 represented the capital expenditure on the new plantation at Rungjung, and Rs. 69,247 the working expenses of the old plantations. The total amount sunk by the Bengal Government on Cinchona plantations and factory, since 1862, aggregates Rs. 10,84,202, which has already been recouped more than twice over by the saving effected in substituting the febrifuge for quinine in Government medical institutions. The cost of manufacture during the year was Rs. 12-5-11 per pound of ordinary febrifuge, and Rs. 18-8-11 per pound of crystalline febrifuge; the rates are higher than those of previous years, which is attributed to the large expenditure incurred in new fittings for the factory, and partly to the inferior quality of the bark used, as well as to the smaller quantity worked up during the year. The issues also show a considerable falling off, as compared with the previous year. Those for 1883-84 realized Rs. 9,144, while during 1884-85 the amount had fallen to Rs. 7,152-4. This decline is said to be owing chiefly to the medical depôts taking 1,656lbs. less than in previous years; while the decrease in sales to the public is attributed to the great cheapness of quinine, the price of which during the year ruled lower than it has for many years. The revenue from all sources amounted to Rs. 1,24,225, and the operations of the year are said to have resulted in a profit of Rs. 37,582, giving a dividend equal to about 3½ per cent on the capital of Rs. 10,84,202. But we are reminded that these profits do not represent the whole of the gain of the year, as the saving effected by the substitution of the febrifuge in Government medical institutions for an equal quantity of quinine, which would otherwise have been used, amounted to Rs. 20,000. These results are satisfactory, especially when it is considered that cinchona seeds were distributed gratuitously to applicants during the year. Dr. King is therefore to be congratulated upon his efficient management of these plantations.

RAMIE, OR RHEA.

Continued from last week.)

Ramie is a perennial plant, and has to be planted but once for every thirty years. The planting is to be done exactly the same as with Irish potatoes. Work the soil well by ploughing. Trace rows three feet apart and plant the ramie roots in the rows at one foot distance; then cover with two or three inches of well pulverized earth. At a distance of three feet each, we will have seventy rows to the acre, and planting the roots one foot apart will give us 210 roots per row, or 14,000 roots per acre. In order to obtain a plantation of straight and well-formed stalks, the plantation must be made close and uniform. The present high price and scarcity of ramie roots would scarcely admit of the average planter investing at once in 14,000 roots per acre; but in order to push forward the propagation of ramie, I would suggest to planters the following scheme:

Leave a distance in planting of three feet between the roots, which, instead of 14[illegible] will make 5,000 roots, to the acre. In three months, when [illegible] will be about two or three feet high, spread them down [illegible] rows without breaking. This will furnish for the autumn new [illegible] will complete the plantation up to 14,000 roots. Besides this, [illegible] take from each mother-root two or three cuttings to plant another acre, and so on. As I have told you at the beginning, ramie is the most prolific of all plants, and Mr. E. Darby, of New Iberia, La., was right when he said to his son a few years ago: "I have planted a good acre of ramie in our garden. When I will be no more do not disturb it; take good care of it. If its utility is not appreciated to-day, the time will surely come when the true value of this plant will be universally recognized and you have in these roots the beginning of a fortune." Various Louisiana planters have in their fields some thousands of ramie plants which they could afford to divide. For my part, I have a large stock of the species Tenacissima, the best of all, which I hold at the disposal of any planter wishing to plant an acre or more of 5,000 roots, payable half cash, half in crude bark from the crops of 1887.

Planting being over, if the summer season is accompanied by a prolonged drought, it will be necessary, during the hot weather, if the soil where the ramie is planted is not naturally moist, to facilitate growth and vegetation by irrigation, which should be more or less frequent according to the permeability of the soil. Irrigation, however, must be stopped fifteen days before gathering.

to permit the stalks to *fortify* and lose their excess of moisture. The land should be disposed so as to permit easy watering. The best disposition consists in placing the plants on small ridges, separated by furrows which serve at the same time the purposes of irrigation and drainage. Like all plants whose leafage is strongly developed, ramie absorbs from the atmosphere a large portion of the elements necessary to its nutrition, consequently it does not exhaust the soil, and will prosper in ordinary ground, whilst hemp and flax need a very rich soil, which they speedily exhaust. It is good at each crop to abandon on the ground the leaves of the ramie plant, which thus return to the soil a part of the elements taken from it. It should not be inferred that ramie is indifferent to the action of fertilizers. Its vegetation is always proportionate to the elements furnished for its sustenance, provided always that they possess an assimilating nature. Therefore, as is the case with plants of rapid development, *liquid fertilizers* are the best. These should be used, mixed with water, in the spring and at every cutting. Farm manure should be employed only as a covering before winter, so as to permit the snow and rain to saturate the soil with its elements. During the first year the culture of ramie requires weeding round the young plants so as to rid them of noxious grasses. When, however, the plant has taken possession of all its allotted space, weeding becomes unnecessary, and the labor is reduced to giving in the spring one stroke of the plough to clean the draining ditches, and another one in autumn to cover the feet of the plant for the winter.

According to the Imperial Treatise on Chinese Agriculture the ramie stalks should be cut before the budding season, when their lower portion begins to assume a brown tint. The harvesting of stalks should be made with a very sharp scythe to avoid tearing, which would interfere with cicatrization. If the stalks are to be used in the green state, they should be made up in bundles of about 200 and carried to the machine. If they are to be used dry, they must be left to dry in the sun as rapidly as possible. This process offers some difficulties, as the stalks contain a great deal of water and are hydrometric by themselves. It will be necessary to use manual labor to turn over the stalks on the ground until they are dry. It is important not to gather them in until perfectly desiccated, for they would then rapidly become mildewed, which would also be the case if they were kept in a moist place. When it is wanted to utilize the ramie leaves for the feed of animals or paper-making, they should be stripped from the stalks at the time of harvesting.

It is important to *bear in mind that ramie, like cotton*, hemp and flax, presents varying qualities, according to soil, mode of culture and harvesting. In China, for weaving the finer tissues, a difference is made even between the fibrous strata on the same stalk. The exterior fibre is coarser and stronger than the interior fibre nearest the wood, which is employed in weaving silk goods. The first crop is shorter, branches off more than the second and third, and produces inferior fibre. Treatment in the green state not requiring that the plant should be fully matured produces a finer quality of fibre and allows cutting when the stalks are about five feet high. This gives also an advanc[illegible] fifteen days on the crop, which in Louisiana would [illegible] making three crops. Practice will teach with more [illegible] what will be best to do, for though the [illegible]mation is derived from positive experience [illegible] experience made in countries different from your own. The average value of the crude ramie bark has been estimated at five cents per pound. At that price there is a great European demand. In addition to this, let me tell you that it is by 100,000 roots that the villages in the south of France are now planting ramie, and since two months the prices of roots have risen 30 per cent. American consumption will, I think, enhance the price of five cents per pound of crude bark, for manufacturers here are at this very moment waiting for a regular and sure production to rear up their fabrics. However this may be, we are ready now to pay five cents cash per pound for the crude bark of ramie, dried and baled, landed in New Orleans, where we establish a branch office. One acre planted now with 5,000 roots will have 14,000 plants at the fall and will produce in 1887 at least fifteen stalks per plant, and a total in round numbers of 200,000 stalks, giving one-eighth of an ounce of bark, or a pound by 125 or 130 stalks, or 1,600 pounds an acre per crop, or for two crops 3,200 pounds per acre, at five cents a pound, $160. Putting down at $60 the annual expenses, harvesting, and *pro rata* of first cost of the roots, we arrive at the splendid result of $100 net profit per acre for two crops, and in Louisiana, with its lengthy fall, joined to the treatment in the green state, which requires less maturity in the plant and therefore less time, three crops are almost a certainty. A certain proportion of the ramie crop will be applied to the fabrication of finer tissues. There will, of course, be a choice of qualities, but the true commerce of ramie will extend upon condition that the average quality of ramie will be produced at a price which will permit its advantageous use in the manufacture of tissues of general consumption. The price of five cents a pound for the crude bark corresponds with the good tissues which are now being manufactured from first quality of flax or wool. Under these conditions I would say to every intelligent American farmer: "Hasten to plant one, two, or three acres of ramie, enlarge your production each succeeding year, and, however large it might grow, there is no possible danger of too much ramie in the United States before twenty years to come. When that moment arrives American genius will meet the emergency."

The great difficulty to overcome in making vegetable fibres usefull as textiles, comes from the cement that attaches the fibres together and the colored pellicle which covers them. The substances to be eliminated for the utilization of these fibres are called, "vasculose, cutose and pectose," and our chemical process produces the effect of dissolving these substances, not only without weakening the fibre but making it stronger and more silky. Other processes have obtained a certain result by the use of caustic alkali with pressure, or such oxidizers as permanganese of potassium, hyperchlorate, chlorine and bromide, but these come high and consume more time than ours. We began first by applying our dissolving agent to ramie with modifications according to the quality of the plants treated. For example, American ramie required 3° Beaume of our dissolvent, while the China grass, already somewhat cleansed, required only a bath of 2° with the same time in boiling, three hours. It is particularly the washing and depurating with plenty of water our chemical bath which should be done with great care. By this means a perfectly distinct fibre is obtained which we bleach and brighten up with our two other products—azotozone and chlorozone. The results obtained have won for us two first premiums at your Exposition.

It is in studying how to dissolve the gummy and resinous matters of the ramie that we have been led to treat almost in the same manner all the textile plants which grow, so to speak, at the very gates of New Orleans; the bananas and silk grass of Honduras, the pita and maguey of Mexico, Guatemala, Cuba, Jamaica, the lily of Florida, and the yucca of the Gulf Coast. I will not insist upon what I have previously said of the certain future of New Orleans as the first market in the world for all textiles. All I ask from this assembly is that a committee be appointed this very evening from among you to study the question specifically and technically with me, and to make a public report of all that can be imported in the way of fibrous product, free of duty, from Mexico, Cuba, Jamaica, Central America, Venezuela, Brazil, etc., and made into commercial textile fibre in New Orleans. Every innovation, as also every new culture, however useful it may be and bounteous its promises, must wrestle against routine and old established precedents, and must have the help of a high patronage. The Irish potatoe, without which people could scarcely exist at present, had a hard fight against routine and ancient customs, and the help of the Court of Louis XVI became necessary for the assertion of the claims of that useful plant to the patronage of Europe. The noblest ladies of that age wore the pretty little violet flower of the potatoe as an ornament, and in that way gave to flower and fruit the desired popularity.

Miscellaneous Items.

There is a report that an International Asiatic Exhibition will be opened in Tokyo in 1890.

The Ceylon Government has announced its intention of spending Rs. 50,000 to ensure an adequate representation of the island at the Indian and Colonial Exhibition.

A Tokyo journal states that a battle between immense numbers of frogs took place in the fields in Imada, Tokyo, a few days ago, and that 200 frogs were left dead upon the ground.

The want of rain is very much felt in Berar. A correspondent writes that, should the present dry weather continue, much injury will be done to the crops. The heat, he adds, is unbearable.

The Cawnpore market report, for the fortnight ending 23rd June, contains nothing of importance. Business in almost all staples continues slack, without any immediate prospect of improved trade.

A DEPUTATION from the Bombay liquor-sellers, who have petitioned the Government of Bombay against a number of the Abkari regulations in force in that city, had an interview with Lord Reay, at Poona, recently.

A CORRESPONDENT telegraphs on the 1st instant:—His Excellency Lord Reay visited Lanowlie yesterday in order to personally inquire into certain grievances brought to his notice in a memorial from the landholders. His lordship returned last evening in time for Lady Reay's first "At Home," which was one of the most largely attended receptions ever known here, there having been above 800 persons present.

NOTWITHSTANDING the present financial pressure, the Government of India have decided to make no reductions in the Bengal Excise estimates for the current year. It was feared that in consequence of anticipated retrenchments, there would have been some interruption in carrying out the recommendations of the Excise Commission, but under present circumstances, the Bengal Government will be able to push on the proposed reforms.

THE Chief Commissioner left Rangoon for Bassein for the purpose of being present at the opening of the Inajei fishery in the Nathangyoung sub-division. We believe the sight is a very interesting one. The river, we are told, is bunded in certain parts, and at the opening season the bund is broken down, and all the fish rush into a vast reservoir or expanse of water, and the lessee and his people then commence their operations. Large crowds go to witness this opening event.

NEWS from Cuttack, dated the 27th ultimo, says that the river has fallen two feet, and all danger to the town is now considered over. The sepoys patrolled the revetments during the two previous nights, and the water was then in some parts within two feet of the top of the earthworks. Heavy breaks are reported in the Pooree division, but no further accidents to life or property are yet announced. Passengers have succeeded in crossing the river at Cuttack. The Kendrapara lock entrance had silted up, but was being rapidly cleared.

WE learn from Bangalore that the locally manufactured spirits are to be sold in bottles in future to those of the public who may desire to go in for the liquor. Considering the number of liquor shops in which Europe-bottled poisons are vended, it seems very desirable that some more wholesome beverage should be sold to those who cannot afford to drink the finer kinds of spirits, but who will drink poison rather than nothing at all. We wonder what teetotal advocates, like Sir Wilfrid Lawson and his following, will have to say to the Mysore Government.

THE total number of deaths registered in Calcutta, during the week, was 150, against 144 and 184 in the two preceding weeks, and 52 less than the corresponding week last year. The mortality from cholera continues to be low, 14 deaths from this cause being registered, against 10 and 16 in the two preceding weeks, the quinquennial mean being 15. There were 4 deaths from small pox against 3 in each of the two preceding weeks. The fever mortality was also low, the deaths being 38 against 44 the average of the quinquennial. The general mortality was at the rate of 1 per 1,000 per annum.

THE total number of deaths registered in the suburbs of Calcutta, during the week ending 13th June, was 144, against 164 and 151 in the two preceding weeks. Under the head of cholera there were 17 deaths, against 26 and 30 in the two preceding weeks. During the week under notice there were 2 deaths from small-pox, 61 from fever, 19 from bowel complaints, 1 from injury, and 44 from other causes. The general mortality was at the rate of 29·8 per 1,000 per annum, against 33·9 and 31·8 in the two preceding weeks; while it was 22·1 in Calcutta during the same period.

THE total number of deaths registered in Howrah during the week ending 13th June was 37, against 40 and 60 in the two preceding weeks. Under the head of cholera there were 3 deaths, against 3 and 15 in the two preceding weeks. There were 11 deaths from fever, 9 from bowel complaints, 3 from injuries, and 11 from other causes. There were no deaths from small-pox. The general mortality during the week under notice was at the rate of 18·2 per 1,000 per annum, against 19·7 and 29·5 in the two preceding weeks; while it was 29·8 in the suburbs, and 22·1 in Calcutta, during the same period. Howrah would therefore seem to have been healthier than Calcutta, not to say the suburbs, during the week under notice.

A CORRESPONDENT writes:—Surgeon-Major Little, the Sanitary Commissioner, Berar, is doing his utmost to introduce indigenous plants for medicinal purposes in the province, and so far his efforts have been very successful. There are many medicinal plants in the districts which are considered almost as good as "European medicine." For instance, the "red pills" are said to be an infallible specific for the "Berar fever." The *lall golies*, as they are called, I hear, have been largely distributed in the Booldana District by the Civil Surgeon, and the result is most satisfactory. It was time something were done to allay the fever.

THE latest official telegraphic report from Sreenugger, dated the 26th June, states that after three days' cessation, several smart shocks of earthquake were felt there, on the 24th and 25th ultimo. People who were returning to their houses have through fear gone back into tents.

THE Forest Ranger of the Musnagudi division has, we hear, been suspended for certain high-handed proceedings of his. It would appear that he compelled all cart-men passing Teppacadoo, from and to Mysore, to pay a fee of three annas per cart, on the pretext that they must, whether they required it or not, purchase a "brake." For this purpose a toll-bar was erected at which *a posse* of belted knights were placed, and who were empowered by the Forest ranger to arrest and charge any refractory cart drivers who refused to pay this illegal exaction. We believe there is no provision in the Forest Act compelling cart drivers to purchase a "brake," nor is there any penal provision which entails arrest and trial for refusing to accept and pay for a "brake." This unauthorized proceeding has, we are told, been in existence for more than a month, and we would enquire—where were the police? We trust that the district magistrate will cause a searching enquiry into this scandal.

The last number of the *Gazette of India* contains the returns of accidents on Indian Railways, for the fourth quarter of 1884. As compared with the corresponding period of the preceding quarter, the number of accidents to trains, rolling-stock, permanent ways, &c., show a decrease of 47, or 13 per cent, against an increase of 1,104 miles, or 10·63 per cent, in the mean mileage open, out of 481,162 miles, or 5·02 per cent, in the train mileage. During the quarter under review there were 612 accidents, in which 11 passengers were killed and 33 injured, while of railway servants four were killed and seven injured. The Government of India draws the attention of the officers concerned to the increase in the number of accidents on the Eastern Bengal, Northern Bengal, and Cawnpore-Achneyra State Railways, especially to the large number of cattle accidents on the Eastern Bengal State Railway.

ALL the records of the Inam Department, Hyderabad, were sealed up, and placed under a guard of the Regular troops. These records are now being removed from the Inam office to Ikram-Alla Khan's house in Sifeabad, and this removal has given rise to the wildest rumours in the city, implicating the highest officials in the Inam Department; but there is absolutely no foundation for them. The sole reason for the removal is the insecurity of the building hitherto used as the Inam office. The military authorities who are now responsible for the safeguarding of the building reported that it was impossible with any guard of ordinary strength to protect it thoroughly, and the Inspector-General of the Revenue Branch, fearing that interested parties might set fire to the building, obtained sanction for the removal of the records to a place of greater security. Information is pouring into the Inspector-General's office of cases in which the *sunnuds* are suspected to be forged. All of these are to be carefully inquired into, but as the Inam records consist of some 30,000 cases, it will be some time before the actual extent of the frauds is known.

AN interminable correspondence in the papers, about insects as food, has at last reached its limit. A letter in the *Standard* assures us that black beetles—the ordinary domestic beetles—when properly dressed, form "a most delicious condiment." Here is the recipe for beetle paste:—

Catch your beetles in a soup plate filled with vinegar, and keep them soaking for six hours. Then turn the beetles out, and dry them in the sun for at least two hours, when the outer shell can be easily removed, the flesh then resembling that of a shrimp, to be put into a gallipot and [illegible]ed up with flour, butter, pepper, and salt, to a thick paste; [illegible] in the oven for two hours, and, when cold, serve with bread and [illegible]. This is the *ne plus ultra* of insectivorous discovery, and [illegible] inexhaustible food supply for the people it opens up! It only re[illegible] some one to try it. Who will be the bold man? Mr. Labou[illegible] who so much envied the Kassala garrison their donkey, will [illegible] something authoritative about potted beetle. Meanwhile, we await with interest the countermove on the part of Keating's "Insect Powder" and Mr. Rowland Ward's "Insect death."

THE *Pioneer* says:—An example of the wisdom with which cities are governed—when the Government happens to be that of an Indian municipal committee—has just been afforded at the expense of the residents of Allahabad. People there who, during the rains, in the general scarcity of vegetables, relish a well-dressed dish of Indian-corn, are in future to be deprived of that luxury. The city fathers, in their wisdom, having ruled that "no high crop of any description shall be allowed to be grown in compounds and sites situated within the Civil Station," the municipal inspector has during the last week been reporting as an infraction of this bye-law every patch of half-a-dozen maize stalks he could find growing in any one's garden, and now warning notices are being issued calling attention to the penalties provided for the daring individual who has the boldness to disregard such an absurd regulation as that quoted above. The absurdity of it is evident when one considers that if the bye-law forbids the growth of *bhuttas* in the hot weather, it must also prevent the growth of any but dwarf varieties of peas in the cold; that French-beans will become an impossibility, and that balsams, hollyhocks, and other high growing annuals in the flower-garden are probably doomed. It is doubtful also whether the regulation, as it stands, will not prevent the growth of fruit of almost every kind. A "crop" of mangoes, plantains, or guavas, is in every sense a *higher* crop than one of maize.

The Khasi Hills are well known for their extraordinary rainfall —Cherra Punji, on their extreme south, is noted as the rainiest place in the world—but the official returns of rain-gauge readings for the three stations in those hills, for the week ending June the 18th, are truly astonishing. Shillong lies in the centre of the hills, Cherra Punji 32 miles due south, and Yowai 33 miles due east of that place; and the readings were:—Shillong 9·80 inches, Cherra Punji 36·43 inches, and Yowai 64·79 inches. In Yowai 51·5 inches fell in 48 hours, and although 40 inches have been measured in 24 hours at Cherra, a contemporary believes that 50 inches in two days is higher than any previous rainfall on record. The comparative paucity of rain at Shillong is due to the fact that it lies in a basin shut in on the east and on the south by hills rising 1,500 feet above it, which effectually take the edge off the rain-clouds. It is little to be wondered at that the Deputy Commissioner has started in hot haste for Yowai, overwhelmed with reports of the carrying away of bridges in high and hitherto dry ravines, and of the flooding of all the valleys that connect it with the plains.

It is pleasing to all interested in the study of Indian numismatics, the only remains of many dynasties of sovereigns, to know that the science of numismatics has found a munificent patron in the person of his Highness the Maharaja of Cashmere and Jummoo. His Highness has lately obtained possession of the largest collection of the coins of Cashmere yet made. This collection contains the coins of over thirty of the old Maharajas, who ceased to reign about the year 1300 A.D. It also contains 25 square silver coins of the old Sultans who were put an end to by Akbar; the copper coins of the same Sultans are numerously represented. Nearly all the Mogul Emperors struck rupees in Cashmere. These are fairly represented in the collection. Ranjit Deo, King of Jammoo, struck coins in his mountain home, the abode of safety, both in his own name and in the name of Shah Alam of Delhi. These are in the collection. After the Moguls, the Durrani kings tyrannized over Cashmere, and struck beautiful coins there. Taimur Shah, Shah Zamān, Shuja-ul-Mulk, Mahmud Shah, Aiyub Shah, Kaisar Shah, and Kutub-ud-Din are represented in the collection. But besides these, which are all coins of Cashmere and Jummoo, the collection contains many others representing kings who have at different times governed the Punjab, and whose names are well known to students of history. His Highness was pleased not only to confer a khillut on the gentleman who made this collection (it took him fifteen years to complete it), but to appoint him Honorary Numismatist to his Highness. And permission has been granted to dedicate "the square silver coins of the old Sultans of Cashmere" to his Highness. It is thus, says the Lahore paper, the native princes of the Punjab encourage efforts to elucidate the history of the countries over which they rule.

Selections.

SWEET ENSILAGE.

[By Professor Sheldon.]

The subject of ensilage is receiving quite an extraordinary measure of attention at the present time. An Ensilage Commission is sitting in London, many experiments are being made by farmers and by scientific men, and quite a number of treatises have been published on the question, so that we may hope for a great deal of reliable guidance before long. The most important book yet published is written by Mr. George Fry, F.L.S., and issued by the Agricultural Press Co., of Clement's Inn Passage, Strand, London, W.C. In this treatise, Mr. Fry divides the subject into the theoretical and the practical, [illegible] both branches in an able and authoritative manner. [illegible] be fairly said that Mr. Fry has gone deeper into the question than probably any other practical man, [illegible] than most scientific men, and it would appear [illegible] the system of producing 'sweet silage,' whose [illegible]eption, I believe, is due to him, will become the prevailing system of the future in this department of agricultural economy. The great objection hitherto entertained against the principle of preserving forage in a succulent condition has rested in the sourness of the silage, which was calculated to injure milk produced by its aid; and the principle has been more or less discounted by the unsustained nature of certain extravagant claims that were made for it, claims to the effect that it would supersede hay-making and root-growing, and would convert coarse herbage and even weeds into nutritious food that stock would relish.

This was the ordinary sour ensilage process that was introduced first of all to the notice of the British agricultural public, and which, very wisely, had cold water thrown upon it by such sound and eminent men of science as Sir J. B. Lawes and the late Dr. Voelcker. But the sweet process is, in its results, a very different thing, and Mr. Fry gives, in the book I have mentioned, a very lucid account of its scientific and practical aspects. In the first portion of the book, he points out that plants contain substances which belong to two distinct classes—those which are formed of carbonic acid and water, which are called carbo-hydrates, and those into the composition of which nitrogen enters—albumenoids, &c. The carbo-hydrates—cellulose, starch, and sugar—do not change into alcohol, acetic acid, lactic acid, or butyric acid, without the intervention or agency of living 'cells.' These 'cells' are the organised ferments, some of them belonging to the animal and others to the vegetable world, which are illustrated by such organisms as bacteria and the yeast plant. Milk and blood are well known to be among the most quickly perishable of fluids, but it has been repeatedly demonstrated that 'the gases of the atmosphere alone are unable to cause any material change in these fluids, and that, consequently, if they are maintained absolutely free from ferments or their germs milk can be preserved from sourness and blood from putrefaction for several months.'

This germ theory lies at the foundation of Mr. Fry's system of sweet ensilage, and it is by controlling the process of fermentation which takes place in the silo that the result in his case is sweet instead of sour silage. The juices of plants are, like milk and blood, subject to fermentations, particularly when the plants in which they circulate are massed together as in a silo, when the circulation has ceased, and the whole mass is inert and in darkness. The fermentive organisms exist in myriads in the air, and many of them are carried into the silo with the forage; but their energy is not destroyed by excluding air from the silo by pressing the forage into a solid mass under heavy weights. The ferments exist on oxygen, it is true, but when they are thus denied the free oxygen of the air, they feed on the combined oxygen in the carbo-hydrates of the plants; and in respect to alcoholic ferments, the work they perform is in inverse ratio to the amount of free oxygen to which they have access—that is, they are driven by the necessities of existence to convert, during their search for food, a larger quantity of sugar into alcohol. Living forage is able to resist the attack of fungi and bacteria, because its cells are active and perform the digestive functions of the plant; but when the plant is severed from its connection with the earth, it slowly dies, and its cells die with it, and in this moribund condition the work of decomposition at once commences by means of ferments—so long, that is, as the plants contain oxygen and moisture in quantity sufficient for the sustenance of the ferments. Remove, however, the moisture, as in the case of hay-making, and there is no longer food enough in the forage for the ferments to subsist upon, and when the hay is in a solid rick free oxygen is almost wholly excluded. The interior of a rick of well made hay will keep good for years, but every one has noticed that the outside of it, which is still exposed to air and damp, commences to decay from the first.

The process of ensilage is wholly different from that of the hay-making, and requires much more care in order to secure a successful result. So long as the cells of plants are living, which continues to be the case for some little time after the connection of the plants with the earth is severed, the action of ferments is frustrated by the evolution of carbonic acid on the part of the plants; and this is the primary reason why ensilage may be preserved in a silo, for dead vegetable matter put into a silo, and still containing its normal moisture would not be preserved in a state fit for food for cattle. Mr. Fry quotes Messrs. Bellamy & Lechartier as follows:—

'At the moment when fruit, grain, and leaves are detached from the plant which bears them, life is not extinct in the cells of which they are composed. This life is carried on apart from air by consuming sugar and producing alcohol and carbonic acid. The instant that the production of carbonic acid ceases is also that when all vitality in the cells is extinguished. Fruit, grain, and leaves may then remain in an indefinitely inert state if an organised ferment is not developed in their interior.' Herein lies the kernel, the secret of the process. During the short time they continue to live in the silo the vegetable cells convert starch into sugar, and in doing so heat is evolved; the thing to be attained is to arrest the process at the right moment, not by checking the evolution of heat, but rather by encouraging it up to a temperature of about 140 degs. F., which has the beneficent effect of destroying the ferments, which would otherwise begin to do their nefarious work so soon as the vegetable vitality of the forage in the silo was extinguished.

The heat in the silo is caused by the absorption of whatever free oxygen may be available, and by the evolution of carbonic acid,—a chemical process in vegetation under these conditions which Mr. Fry terms, very happily indeed, 'intercellular oxidation.' The temperature attained in the interior of the silo depends mainly on two conditions—the quantity of oxygen introduced with the forage, and the quantity of water present in the forage. The normal moisture of the forage is all that should be present, and rain water additional is a deterrent to the desired temperature. If the vegetable cells are still living when all the free oxygen has been consumed by them, they will maintain the short remnant of their existence upon the combined oxygen of the sugar, during which alcohol will be produced and more carbonic acid evolved. This chemical process Mr. Fry terms, also happily, intercellular fermentation, to distinguish it from ordinary alcoholic fermentation. In regard to this feature, Mr. Fry has come to the conclusion that 'alcoholic ensilage is produced by the action of the cells of the ensiled plants, and not by independent organisms.'

With the transformations last mentioned, the action of the cells comes to an end, and subsequent changes of a similar character, when such changes take place, are of a more serious and deleterious nature. 'No kind of acid fermentation is produced by the cells of the plants,' he says; 'therefore, in producing some ensilage there must be a loss caused by the transformation of nitrogenous substances as well as in that of carbo-hydrates.' 'The produce of aldehyde from alcohol is a process of oxidation, and acetic acid is produced by a further step in the same direction. The oxygen necessary to produce these changes must be obtained from some other organic substance in the silo, probably one containing nitrogen.' The production of acetic acid is accompanied by a loss of feeding properties in the silage, and can only be avoided by the destruction of the germs, the *mycoderma aceti*, which produce it, which is done when the temperature of the silage rises 60 C., 122 F.)

Various other kinds of fermentation are produced in a silo, unless means are employed to prevent them, and of these lactic acid is one of the most important, and desirable to be avoided. The mode of producing lactic acid is not at present so clear as that of producing acetic acid; but if a silo be filled rapidly, and every layer pressed down well by treading, or by other means, if every precaution be taken to exclude the air, and the forage be covered up quickly and weighted, then the silage will be sour, chiefly on account of lactic acid. Mould or mildew is produced by the presence of sufficient air to start the spores into life when the cells of the plants are moribund or dead. While the cells of the plants remain alive and vigorous, producing intercellular oxidation, they resist the attacks of organisms, such as fungi and microbes; and the heat evolved by them, if it reach 140 degs F., or so, is sufficient to destroy the fermentive organisms which may be present, and the result is sweet instead of sour silage.

The foregoing is the scientific aspect of the system of ensilage, and, taken by itself, appears a formidable thing. Similar explanations, however, might be given of various other matters with which the farmer is almost daily concerned, so that after all there is not much to be alarmed at in it. The ordinary practical farmer cannot be expected to work out for himself these transformations in matter, and the causes of them; but as he holds in his hands their practical application, it is just as well he should know that he is constantly in company with most interesting and intricate natural phenomena, all of which are more or less amenable to the treatment which is recommended by common sense and experience. In my next article I purpose dealing with the practical aspects of the ensilage question.—*North British Agriculturist.*

THE OPIUM TRAFFIC.

The *Standard* is in a position to state that, although the new arrangement relating to the opium traffic has not yet been signed, and may not be formally concluded for two or three weeks, it has been practically accepted by the Governments of China and England, and there is not the least doubt that its provisions will come into force almost immediately "The arrangement takes the form of an additional article to the Chefoo convention, signed by Sir Thomas Wade in 1876, and one of the clauses or sections of this article requires its ratification, and with it that also of the Chefoo Convention, as it may be amended or altered by this additional article. The two principal stipulations contained in it are the abolition of the inland barriers for opium, and the adoption of a uniform rate for lekin. The uniform rate of lekin is to be 60 taels per chest while the existing customs duty of 30 taels per chest—established by the Treaty of Tientsin—remains unchanged. Hitherto lekin has varied with the port, ranging from as high as 88 taels in some parts, to as low as 21 taels in others. The adoption of a uniform rate will remove many existing causes of discontent; and as the lekin will henceforth be collected by the maritime customs officials instead of by the lekin officers, there will be considerable saving to the Chinese Government, at the same time that all room for uncertainty will be removed, as to the whole importation of foreign opium paying its full amount of lekin into the Government coffers. There will also be an improvement in the mode of collecting the lekin, for opium will henceforth be deposited in special receiving-houses which will in the course of a little time be converted into bonded warehouses, and the lekin will be paid to the customs officers before the purchaser can remove the opium. The payment of 90 taels, or 30*l.*, per chest, will frank the opium throughout the whole of China; and the principal barriers will cease to have any significance in the matter of opium although they will remain in force for other articles of commerce The arrangement is considered to be most satisfactory by both Governments; and the extension of the same principle of levying both the customs and the lekin at the ports, to ordinary merchandise, seems likely to occur within a reasonable period of time, when articles of foreign production will be able to reach the interior of China on known conditions, and without being subject, as at present, to the virtually prohibitory tariffs of the inland barriers."

Commenting on the above statement, another contemporary says:—"The announcement that the opium trade with China is to be placed on a more satisfactory footing is matter for congratulation. Our business with the Celestial Empire is so considerable, and Indian finance is so closely concerned in it, that England must benefit by anything that gives greater solidity to our relations with the Government of Pekin . . Nothing is more fatal to the highest prosperity of commerce than vexatious and uncertain tariffs, and the Governments of London and Pekin will have done excellent work if they have brought the markets of China, India, and England into closer working proximity. The inner wealth of China has yet to be tapped, and English manufacturers will not be the worse for any stimulus afforded to their productive energies. The East may yet make up for the injury inflicted on this country by the European and American protective systems. We may trust that the Governments of India and England will not forget that China has a western, no less than an eastern side Yunnan, one of the wealthiest of its provinces, is approached most easily by the valley of the Irrawaddy. If it could once be joined efficiently with Rangoon and Moulmein there would be a splendid opening for our men of capital, enterprise, and industry Unfortunately, the wretched King of Burmah, Theebaw, blocks our road, to some extent, at Mandalay; but if we understand Mr. Colquhoun rightly, we must avoid that unpleasant monarch by running a railway through the independent Shan States. It is certain that the northern inland country of the Indo Chinese peninsula, and the southern inland country of China, have potentialities of immense wealth. Horrible as the tyranny of the Burmese king is, and oppressive as is his system, or want of system, in burdening his people with imposts, the exports and imports between Independent and British Burmah in 1880-81 reached a sum of over 3,000,000*l.* These territories maintained in ancient times enormous populations and the ruins of vast cities go to bear out the discredited stories of the Portuguese traveller, Pinto. The trade with Yunnan and with the Shan States only wants opening up, and then, if the irresponsible ruler at Mandalay is kept in order, a splendid future awaits the English provinces on the eastern shore of the Bay of Bengal. As trade follows the flag, the increase in riches of our possessions will be felt at home. The interior of China reached through Yunnan, and not barricaded to the trader by the fickleness and whims of officials, will be a most sensible addition to the world's markets. Still, promptitude to seize opportunities and vigilance as against rivals are needed in our Ministers, as it is notorious that French intrigue has lately been very busy in Bangkok and Mandalay. Supineness might lose England and India much that they can ill afford to lose. The magnificent lands on our North-eastern Indian frontier are the natural trade appanage of our Eastern dominion, and we cannot allow our influence to be ousted from them. We have been so busy retiring in various parts of the world, that it would be a change full of relief to the nation to know that in one region at least we had managed to maintain a firm footing, if we did not advance. There is another aspect of the new opium arrangement which is worth consideration. The opium trade with China has been a frequent subject for vituperation on the part of a certain class of philanthropists. These men have insisted that we were poisoning the Chinese with the deleterious drug in their own despite, and in order to put money in the pockets of that great power of opium, the Indian Government. The Chinese now see that prohibition is a failure, and as men will have what they have a craving for, they are trying their best to organise the trade on a sound footing. The outcry against the great source of traffic between India and China was wrong-headed and unreasoning. Like other good things the narcotic which so many Chinamen love to inhale in the form of smoke could be used to excess. Poor compatriots of Ah-Sin would spend a great deal more than they could afford on the very soothing pipe, and some of them, no doubt, were brought within a measurable distance of the Celestial equivalent of our work-house by undue indulgence. But a few cases of excess were no sufficient reason for depriving toiling millions of the human family of the main luxury of their lives, of a solace "full of sweet dreams, and rest, and quiet breathing" Even if that staff of contemplation, the opium pipe, were so mischievous an institution as it has been said to be, the Chinaman, like the Englishman, was not likely to be compelled to virtue by severe measures of repression. Now, however, that the Pekin authorities are to be thirty pounds in pocket for every chest of opium imported into their country, they are not likely to quarrel with what is so handsome a source of revenue, and our sterner moralists in England will have much of the ground knocked away from under one of their pet grievances. In any case the world must benefit by every fresh step made by China towards bringing itself into more complete harmony with the commercial conditions of the times in which we live —*Overland Mail.*

COFFEE CULTURE IN AMERICA, ASIA, AND AFRICA.*

The volume which invites the following remarks, though it cannot be called entertaining, will certainly prove interesting, not only to the "apostles of temperance," but to the thousands of people engaged in the production, sale, and consumption of the fragrant coffee berry. The Dutch Government have recently become alive to the fact that the Brazilians are running them out of the market, and their not unnatural desire to ascertain the cause led to the sending a special mission to South America, and to the collection of the mass of statistics and evidence before us. Brazilian coffee is now consumed everywhere; in France, Germany, Sweden, Norway, [illegible], Italy, Portugal, Russia, and even Turkey, there is more Brazilian coffee consumed than any other sort. Now in Dutch India there are about 22 000,000 people directly interested in the coffee trade, [illegible] in Brazil there are only about 4,000,000 affected by it. The [illegible] coffee-producing regions of the world are Venezuela, with [illegible], and the United States with about 9,000,000, interested in the trade. These figures, of course, give the populations affected by coffee cultivation, [illegible] number of people actually engaged in the trade, which is [illegible] smaller; but they serve also to point a moral, for when added together, they amount to 37,000,000 people; but in Ceylon, Madras, and Bombay, there is an aggregate population of 70 000,000 interested in the coffee plant. Thus it will be seen that Great Britain has a stake in the affair twice as great as that of the rest of the world combined. The consciousness of the great importance of the subject to the British is the probable cause of the Dutch report appearing in the English language.

The author goes into the question with Teutonic minuteness, giving the physical and geological characteristics of Brazil, the history and politics of the young empire, its trade, banking transactions, railways, its finances, and domestic institutions—*i.e.*, slavery. Brazil is much in want of slaves, but modern society has cried out upon the institution, and it has been condemned. The slaves now existing are sooner or later to be set free, and fresh importation is stopped; accordingly, the great problem is the provision of cheap labour. This circumstance has made the slave master of the situation. His life has to be cherished and his convenience studied, he is carefully clothed and even extravagantly fed, thoroughly trained physicians attend upon him in sickness, schools are provided for his family, and he is taught music, and encouraged in innocent dramatic and other pastimes to please his mind. Every reasonable effort is now made to prolong his useful life, and although corporal punishment is inflicted, it is done in deference to the wishes of the slaves themselves, who prefer to be thus chastened for their offences rather than endure the *ennui* of a gaol. Still, the day of free labour is approaching, and in a few years will have to be in full operation. No less than 148 colonies have been started, but they have all miserably failed, and are doomed to inevitable failure, because no free man can work in competition with a slave. Thus while slavery exists there can be no free labour; and yet free labour must be got into operation before the extinction of slavery. The number of slaves is, however, very small, there being only 284,000 of them altogether, and a bold effort might be made to buy up the lot; but, alas! the Brazilian expenditure already exceeds the revenue to such an extent that the accumulated deficits of the last ten years have amounted to 294,942,774 milreis, or about 30,000,000*l*. At the same time Radical reformers and abolitionists are discountenanced in Brazil, as may be seen by the speech of Senator Martinho Campos in the Chambers on August 21, 1880. That outspoken representative did not hesitate to say that, "as for the abolitionists, I regard them as robbers, *against whom I can use my revolver*." Mr. Chamberlain's party would be met with something stronger than talk in Brazil.

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* Brazil and Java. Report on Coffee Culture in America, Asia, and Africa, to H.E. the Minister of the Colonies. By C. F. van Delden Laërne. With Plates, Maps, and Diagrams. W. H. Allen and Co.

The recent use of machinery has given to Brazilian coffee a great impetus, and the market has been extended by a judicious use of Exhibitions. Liberal quantities of carefully prepared coffee have been distributed gratis at close of these Exhibitions, with the natural result of creating a taste for the article. The Russian Government has also encouraged the introduction of coffee, with a view to the reduction of drunkenness. The labour question is the only real obstacle to the achievement of a great future by Brazil, for no country in the world offers greater advantages to the colonist. The Chambers, however, imitate the pattern institution in London, and waste year after year in talk, varied by mischievous interferences with trade, arising from the political manœuvring of "those who govern" and "those who desire to govern." The extension of any branch of trade under such a government is a marvel, and it is still more marvellous to find such a country steadily displacing from the markets of the world one prime article of consumption.

The report before us deserves to be studied quite as much by the English as by the Dutch, and those engaged in the coffee trade ought to feel much indebted to the Dutch Government for procuring and publishing so much sound information on the subject. The maps of the various coffee-bearing districts are carefully drawn to a large scale, and tabular statistical matter appears to furnish all the details that the most inquisitive might desire to know.—*Overland Mail.*

A COLONIAL VICTORY OVER LOCUSTS.

[BY MISS C. F. GORDON CUMMING.]

WHILE war and rumours of war in each of the five great continents of the world form the all engrossing topic of thought and conversation, it is satisfactory to be able to note one hard-fought little war in which British perseverance has happily been crowned with eminent success. I allude to the Locust War in Cyprus, which has of late years filled so large a place in the history of that isle. Though the ravages of these rapacious little foes have been an oft-recurring trial to the Cypriote husbandmen, frequently calling for Government intervention, the insect legions shewed so alarming an increase about five years ago that it was evidently necessary to institute a war of extermination on a most systematic scale. This was accordingly undertaken by Sir Robert Biddulph, High Commissioner of Cyprus, from whose official reports we have from time to time been enabled to form some idea of the magnitude of the task. That such a hope as that of exterminating the winged foe could reasonably be entertained [illegible] fact that, unlike other migratory locusts which [illegible] fertile lands in all parts of the world—notably, as [illegible] recently had occasion to note, in the United States of A[illegible] (see *Nineteenth Century*, August, 1883, and [illegible] 1885)—the hungry hordes which devastate the fair [illegible] Cyprus are all born and bred on the isle; no evil wi[illegible] wafts them from the mainland or sweeps them [illegible] watery grave in the Mediterranean; [illegible] and dies in the land of its birth, and then each [illegible] in its native soil the egg-sacks which produce a hundred-fold increase in the ensuing year. According to Mahomed each mother locust lays ninety-nine eggs—"Were the hundred complete," says the Koran, "they would consume the whole world and all that is in it!"

That this sad fate was in store for Cyprus appeared so evident, that, in 1880, it became positively necessary for the Colonial Government to take the matter seriously in hand and organize measures for the salvation of the isle. It was therefore made compulsory on every male, between the ages of eighteen and sixty years, to collect a certain weight of locust eggs, to be paid as an annual tax to the Commissioners appointed to superintend this work of destruction in the three districts—namely, Famagusta, Larnaca, and Nicosia. It was stipulated that the egg-sacks must be delivered clean, without any admixture of earth; so we may form some estimate of how enormous was the diminution of the foe, when we learn that the weight of the tiny grain-like eggs destroyed in the autumn of 1880 was actually 236 tons. This, however, was far exceeded in the following year, for notwithstanding this wholesale destruction the remnant that escaped detection and survived to deposit their eggs was so great that no less than 1,330 tons weight of locusts' eggs were destroyed between July, 1881, and February, 1882. Nevertheless, so great was the multitude of cunningly buried egg-sacks which escaped detection that, when the hatching season arrived, there was apparently no diminution in the vast swarms of living locusts which presently appeared—hungry hordes, threatening immediate famine, and suggesting ever-increasing legions for future years.

It was evident that measures for their wholesale destruction must be organized on a far more extensive scale. The preparations for war included such items as 5,500 canvas screens, each fifty yards in length; tools for digging great trenches, and payment of labourers, who were required to keep watch day and night wherever the presence of the foe was suspected. In the districts of Famagusta alone, 32,220 pits were dug, and all these were in due time filled with a densely packed mass of struggling locusts, the total weight of insects thus destroyed in this one district alone being above twelve thousand tons! It might well be supposed that such wholesale massacre would have effectually [illegible] thinned the locust-legions. But again the survivors proved to have been so numerous that the swarms of the following spring were actually as large as those of any previous year, and the official reports stated that they were still gaining ground. It was evident that yet more vigorous measures were requisite, so the infested area was sub-divided into smaller districts, each of which was placed under the closest supervision; 65,000 pits were dug, and 8 000 additional screens were prepared and kept in active movement, preceding the march of the foe. While Government officers were thus energetic, they were sorely tried by the amazing inertia of the peasants, whose indolence even outweighed all ordinary prudence of self-interest. Thus the Government engineer, Mr. S. Brown, reports arriving at a village where he found only a handful of old men and boys vainly working at the locust pits and screens, utterly unable to cope with the multitude of locusts which swarmed past them, actually crawling into the streets. To his disgust he found troops of able-bodied men (the owners of the lands and the crops which were in such imminent peril) idling at the cafes, and refusing to work, because, they said, "Government, having undertaken the business, would, of course, accomplish it, but that they did not choose to work for such a low rate of pay" (the rate offered being equal to that habitually given for hard work on the roads). Truly, in dealing with such people there was much to be said in favour of the Turkish system of compulsory labour which has only been abolished under British rule. In like manner when every nerve was being strained to discover and clear every locust breeding ground, news was received very late that a large quantity had hatched, and were already well grown, in an isolated district about thirty-five miles from any other locust bed. This must have been known to many peasants, and to the inhabitants of a neighbouring monastery, but no one had the grace even to send information to the officials. Notwithstanding such drawbacks as these, which led to the escape of many insects as a reserve to supply future trouble, [illegible] is estimated that the locust slaughter of 1883 must have [illegible] somewhere about two hundred thousand millions!

Although the locust crop of 1884 gave good proof of the [illegible] benefits of this wholesale massacre, there was still good cause for [illegible] Vigilance and unremitting care. To the working material [illegible] were added 3,800 zinc traps, made on a new sys[illegible] canvas screens, making of these a total which, [illegible] also 2,860 would have made about 315 miles of canvas [illegible] placed in a line. [illegible] divided into still smaller districts for [illegible] The island was [illegible] supervision, but the reduction in the number of the foe [illegible] rendered a corresponding reduction possible in the force [illegible] employed to cope with them. Only 2,000 persons were [illegible] employed, of whom 1,400 were labourers working on [illegible] contract. By judiciously marching these from one point to the other they were able to do all that was requisite. At [illegible] point, however, a serious alarm arose for the locusts, [illegible] suddenly changed their line of march and outflanked their watchers, had actually reached the standing crops. [illegible] this emergency a working party of English soldiers was called out, and thirty-two men of the Queen's Own West Kent Regiment were marched out to do battle with this tiny but serious foe. It is superfluous to say they did their work right well.

To the joy of all concerned these long sustained efforts have at length been crowned with such success that last year literally no damage to crops was reported, and, though it is evident that there will always be a sufficient number of survivors to necessitate ceaseless vigilance, and the preservation of locust war material, as an annual item in the national expenses of the isle, it may now be considered that the great plague has been successfully conquered. It is now proposed to render it compulsory on owners of the soil annually to plough all lands where deposits of eggs are known to have been made. Also that rewards shall be given (graduated according to the distance travelled) to all persons reporting hatches not previously known to Government, and that fines should be levied on persons who, knowing of such, have failed to report them. The total expenditure incurred in this warfare has been:—For the year ending June, 1882, about £32,000; for the year ending June, 1883, about £12,300; for the year ending June, 1885, about £9,000—a considerable item in the outlay of the isle, but one which will very quickly be refunded by the rich harvests, now happily safe from the all-devouring foe.—*Pall Mall Gazette.*

A SKILFUL SURGICAL OPERATION.

THE American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billroth, [illegible] Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms:—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "*all gone*" sensation; a sticky slime collects about the teeth, especially in the morning

Miscellaneous Items

GOVERNMENT have sanctioned the sum of Rs. 1,54,000 for survey and settlement operations in Sind for the current official year.

THE Simla Naturalists Club was inaugurated the other day, Mr. [illegible]bert being elected President, and Colonel Crookshank Secretary. A goodly number of members was enrolled.

THE Katni-Umaria Railway is expected to be opened in November next, the line being one that will probably yield a revenue immediately it has escaped the financial pruning knife.

IT appears from the usual monthly return of shipments of tea from Calcutta that, from the 1st May to 30th June 1885, a total of 4,435,574lbs. of tea have been exported to different parts of the globe, as against 2,295,870lbs. in 1884, and 2,562,461lbs. in 1883.

FRENCH brandy is sold in Pondicherry at the rate of ten bottles for Rs. 3-6-0, or equal to about Rs. 4-0-0 per dozen; and white grain Mauritius and Bourbon sugars are advertised at Rs. 50 per French candy of 528lbs. English—equivalent to one anna and six and a quarter pies per lb.

THE prospects of the rainfall in Bombay were certainly improved the other day. There were several heavy showers during the day, and although only one inch was registered on the Esplanade, where the fall seems to have been slightly above that in other portions of the city, there is every prospect of a continued downpour.

THE salt returns for April and May show a slight falling off, as compared with the same period of last year. The number of maunds sold during each of these months was 2,636,000 and 3,044,000 respectively, against 2,816,000 and 3,305,000 in 1884. There was, of course, a corresponding decrease in the revenue returns.

MR. M. FINUCANE, C.S., Director of Agriculture and Commerce, Bengal, visited the Board's Office on Monday afternoon, the 13th instant, to concert necessary measures, in consultation with the Honorable H. J. Reynolds, B.A., the Senior Member of the Board's Office, for the location of the Agricultural Office, Bengal, in the Board's office buildings.

THE total number of cobra snakes killed within the limits of the Civil and Military Station of Bangalore, during the past month, was 20. The destruction of these reptiles cost the local Municipality Rs. 16-2-0. The total number of dogs destroyed during the month of June last was 163, at a cost of Rs. 26-2-0, which was also defrayed by the Station Municipality.

THE *Indian Spectator* says :—Mr. J. E. Mody, of 57, Hornby-road, has shown us some tea plants brought down by him from the Kangra Valley. He gives a very interesting explanation about the growing and preparing of the best varieties of tea. Mr. Mody seems to have brought with him over a hundred plants, at considerable expense, and he deserves encouragement.

INTIMATION has been received by the Government of India that a separate court will be set aside at the Colonial and Indian Exhibition, 1886, for private exhibitors, who wish to sell and deliver their goods during the Exhibition. Applications for admission to this court should be made to Messrs. King, Hamilton and Co., of this city, and Messrs. King and Co., Bombay.

A CORRESPONDENT writes to a Madras paper that a perfect cure can be obtained for cobra poison by taking pills made up of the following ingredients :—'Ameium zedoria, Ophioxylon Serpentium, Arsenicum Album, Arsenicum flavum, Arsenicum rubrum, Aristolochia Brachiata, and Gardenia dumuto rum. An equal part of each of the above is to be mixed for three hours with betel juice, and made into small pills, three of which are sufficient to effect a cure.'

MONSIEUR A. ROUSSEAU, Sub-Secretary for the French Colonies, has written to the Governor of the French Indian Colonies at Pondicherry, enquiring whether native gardeners can be engaged in the Franco-Indian settlements to proceed to Obock, to take service under Government for employment in the new public garden about to be established at that station. The primary object of the French Government is to obtain a supply of fresh Indian and other vegetables for the local market and the shipping; at present, green vegetables are quite unknown there.

THE Dewan of Mysore has ruled that a revenue sale should be stopped if payment of arrears of kandayam be made before sunset of the day previous to the date of sale. A payment or offer of payment after the sale is no ground upon which the Deputy Commissioner can cancel a sale. The Deputy Commissioner has the power (whether on his own motion or upon complaint of any party interested) to refuse to confirm a sale on the ground of some material irregularity, a mistake or fraud in publishing or conducting it, causing substantial injury to any person affected by the sale. If the Deputy Commissioner refuses on grounds above specified, he must cause a re-sale to take place. If he does not so refuse, he must confirm the sale within 30 days from date of sale. The Deputy Commissioner's attention is called to Sections 193 and 194 of Draft Revenue Code which contains the existing law on the subject.

SOME 40 inches of rain in five days at and below Kurseong, at the end of last week, and a steady downpour daily ever since, reaching 20 inches in 2 days, caused many slips which obstructed our little Railway; the obstructions are now reduced to one at the 12th mile, and this was expected to be cleared last evening, and then through communication would be restored. In spite of the obstructions, as most of our readers know, the Mail trains have been fairly well run to time, much to the credit of the staff.—We have just received information that through communication has been restored, and the working of goods traffic resumed.—*Darjeeling News.*

THERE is a composition known as "Mystery gold," which, in the hands of the nefarious, is an artful trap to catch unwary pawnbrokers. With a name which in these days of strange titles suggests a new sensational novel, "Mystery gold" is calculated to deceive even the expert "Uncle." Mr. Attenborough, an authority on the snares to which pawnbrokers are liable, explained in a recent case before a magistrate that a large number of sovereigns had been made of it, and circulated throughout the country. The composition, consisting of platinum, tin, and copper, stood the tests of the ordinary acids, and was of the weight of real gold.—*European Mail.*

A PECULIAR kind of fish was caught in the river off the East Gate the other day. Its skin is not covered with scales, but is smooth and velvety to the touch, if stroked from the head towards the tail, and rough if rubbed the other way. Between its eyes and extending forward is a horn about two inches long, while on each side of the tail-joint are two sharp spurs. The fins are large, the dorsal and belly fins extending the whole length of the body. A similar fish is said by the fish-sellers to have been caught over twenty years ago, though the specimen then obtained was much smaller. A gentleman who heard the fish was in the market purchased it, and has sent it to the Museum.

THE Chief Commissioner of the Central Provinces was to have left Pachmarhi on the 13th instant for Simla, on business connected with the new settlement of the Province, which is already under weigh in the eastern districts—Raipore and Sumbulpore. The last settlement was an easy one, as suited the circumstances of a young province; but roads and railways, then unknown, have now opened up the country and developed its fertile resources to such an extent, that an increase of revenue may be looked for without any fear of unduly burdening the agricultural classes. It is fortunate that the Province just at this time should have at its head a specialist, in Settlement work of such repute as Mr. Crosthwaite.

THE last number (7th July), and the first of the new volumes of the *Indian Planters' Gazette* received by us, shows that the proprietors are determined to make it a popular and attractive magazine —to wit, a new and ornamental cover. The reasons assigned for changing the old wrapper are, primarily, to make the journal "easily distinguished among other papers"—no doubt a very material point in these days. We are glad to learn that it has made such rapid progress during the short time it has been in existence; and it is satisfactory to note that it continues to be appreciated by those for whose benefit it was originally inaugurated. With a new era in its salmon covering, we wish the *Indian Planters' Gazette* the success which its enterprising proprietors deserve.

THE cyclone which broke over Rangoon last month blew down the [illegible] barn-like building in Pegu, which had been used as the Deputy [illegible] Court House. Fortunately it occurred early in the [illegible] only a few attendants were in it, and except one peon [illegible] hurt in the leg, no other casualties were experienced. The [illegible] was moved into another thatched barn, formerly used by [illegible] Department, and where it will remain until next month, [illegible] D. P. W. hope to have the new public buildings ready for their accommodation. These are pucka built, roofed with shingles, and prom[illegible] an ornament to the town. As the place where the establishment [illegible] is not floored, it will certainly be to the advantage of the health of all concerned to get into a pucka building.

THE reductions which the Government of the N.-W. Provinces propose to effect in the estimates of the current year, consequent on the financial pressure engendered by military necessities, amount to twenty and a-half lakhs. The main heads under which the retrenchment falls are as below :—

	Rs.
Land and Separate Revenue	1,00,000
Forests	50,000
Jails	2,50,000
Education	1,00,000
Minor Department (*Under Director of Agriculture and Commerce*)	50,000
Irrigation	1,50,000
Public Works—	
(a.) Railways	9,00,000
(b.) Ordinary	4,50,000
Total ...	20,50,000

Of these items of reduction, it will be seen, all are purely Provincial, except Forests—which under present arrangements are equally divided, both as regards revenue and expenditure, between the Imperial and Provincial Governments—and, secondly, two lakhs of the ordinary Public Works expenditure, which come under the head of Local.

WE regret to hear of the death, at Salem, of the Hindoo artizan well-known in Southern India, Arnachella Auchery, at the age of 92 years. The deceased was a native of Arcot. At an early age, he gave promise of becoming a worthy artizan, and entered life as a blacksmith in a factory at Trichinopoly, and then went to Coimbatore. Mr. Heath, a commercial agent, who took an interest in Arnachella, got him settled at Sivapet, Salem, where he opened a factory of his own. Arnachella was an excellent workman, and he carried away medals at the Amsterdam and Vienna Exhibitions for the excellence of his work, and also at the Agricultural Exhibition held in Madras in 1881. When the Prince of Wales visited Salem, Arnachella presented his Royal Highness with a shikari knife, the handle of which was made of tigers' claws and teeth. His Royal Highness, in return, presented him with a knife containing thirty-seven blades. The deceased amassed a large fortune, and has built several choultries, and his death is regretted by the people of Salem.

THE *Pioneer* says—"The collapse of the Bombay Exhibition scheme is to be regretted, as the failure of any measure designed for the encouragement of humanity, must be matter for commiseration. But there is a limit beyond which public expenditure is always inexpedient, and from the lack of enthusiasm displayed for the Exhibition of late, the Government acted wisely in refusing just now to embark public money in a doubtful enterprise. When economy is the urgent order of the day, State aided Exhibitions would be as out of place, as are large dinner-parties given by a man engaged in cutting down his household expenses. We hope, however, that the indefinite postponement of the Exhibition is only indefinite in the sense that the duration of the present reign of economy is undefined, and that the scheme will be revived as soon as possible. It is quite as well, perhaps, that a decent interval should elapse between the Indian Exhibition at Home and a similar one in Bombay, and meanwhile that go-ahead city may rest content with the success of its exhibits at Antwerp and Amsterdam.

Selections.

THE ADVANTAGES OF TOBACCO.

DR. PAREIRA states in his Materia Medica that he is "unacquainted with any well determined ill-effects from the practice of smoking," and Christison speaks of it as a luxury used all the world over without any bad effects having been clearly traced to it." In a letter of Dr. Parke's, author of "Parke's Manual of Practical Hygiene," in the *Lancet*, page 381, 1880, he confesses that he has searched in vain for any satisfactory evidence of the harmful effects of tobacco, and that it was for this reason that its consideration was not given place in the work mentioned.

The fact has been pointed out that men are on the whole as healthy as women, while nine out of ten of the male population of the world use tobacco, and women as a rule abstain. In the learned professions, about one-half of the ministers are addicted to it in some form, likely, three-fourths of all physicians, and nine-tenths of members of the legal fraternity.

In looking calmly at the tobacco question, there is one feature calculated to excite alarm, and that is the habit of chewing and smoking so widely practised among boys. Th[illegible] to young growing boys, is unqualifiedly hurtful. They vol[illegible] endure the first disagreeable effects of the tobacco [illegible] they consider an accomplishment, the habit is [illegible]ned, and with an entire ignorance of its powers, [illegible] tendency to immoderation, the growth and develo[illegible] often seriously interfered with, and the worst re[illegible]ow. They smoke and chew generally the worst [illegible] and to a degree which would positively be harmful with the majority of adults. This matter should [illegible]cted by proper action of our legislators [illegible] the responsibility rests. Smoking, when done [illegible] proper times, facilitates digestion. The sense of relief obtained by a cigar, after a heavy meal, is well known to smokers. Dyspepsia sometimes follows the discontinuance of tobacco, and is removed when the habit is resumed. While the abuse of tobacco weakens the system and leads to emaciation, used intelligently it exerts favorable influence upon nutrition.

Hammond, by observation upon himself, found a gain in weight with the use of tobacco. Fiske attributed an increase of twenty pounds in three months to tobacco. "Tobacco, when the food is sufficient to preserve the weight, increases it; when insufficient, and the body is losing, tobacco restrains the loss" (Hammond). Boerhaave, of Holland, over two hundred years ago, referred to tobacco as being antidotal to hunger. It seems that the power to undergo severe exertion and fatigue, either mental or physical, is aided by tobacco. "Soldiers of all nations use it. It was a standing injunction of Napoleon that his troops should have tobacco, and it was of great advantage in the retreat from Moscow." (Fiske.) During our late war the soldier would be patient under very severe privations, if he but had a good supply of tobacco to smoke or chew, and when on picket duty would risk his life to strike a match for his pipe.

Situations for loneliness are always rendered more tolerable by tobacco, and it is the constant companion of those who lead lives of solitude, such as that of the herdsmen or ranchmen. A feeling of unrest or discontent made up of ill-defined longings, of imaginary disappointments, and unpleasant anticipations, commonly known as ennui, is responsible for much unhappiness. This unfortunate condition of mind is removed by the soothing influence of a cigar, and the moroseness and gloom are quickly dispelled. As much of every day is filled up with care, our degree of comfort in this life will depend largely upon our ability to bear it uncomplainingly. That tobacco assists us to do this; that it enables us to look upon life more complacently, must be the conclusion of every one who has experienced its influence. That it enables us to toil with less fatigue, is equally true. The readiest writers generally use tobacco, and cannot accomplish the same amount of work in the same time without it, and those connected with newspaper and other literary work, who have often to write against time, find it of inestimable value.

Tobacco formerly enjoyed a deserved reputation as a medicinal agent, and was extensively used in scabies and other cutaneous disorders. It has been largely supplanted, however, in modern practice, by other remedies. The use of tobacco during a mercurial course decreases the risk of salivation, and cases of ptyalism have been reported cured by its employment. Before the discovery of chloroform, tobacco served a useful purpose in the hands of the surgeon in cases of strangulated hernia for obtaining complete relaxation. Tobacco constitutes a most valuable addition to the ordinary poultice in local painful affections. In two cases of carcinoma of the breast, by incorporating it in a local application, a marked advantage was noticed by the writer in the relief of pain. As an ingredient in asthmatic cigarettes, with belladona, stramonium, etc., it is entitled to share in the remedial effect.

The limited medical range of tobacco is unimportant in comparison with its social and physical influences. Among its ma[illegible] beneficent powers, it appears to allay worry and lighten toil. [illegible] an aid to mental work, and a help to reflection and complac[illegible] It promotes sociability, and in the words of one of its cham[illegible] "makes a man act more like a Samaritan." [illegible] neither liked nor needed by animals, who lo[illegible] to be required and craved by man, to [illegible] tonistic properties appear peculiarly grateful an[illegible] It has repeatedly and unjustly been called a curse [illegible] have written most of its baneful effects, as a rule, [illegible] it. Indeed, this comforting substance is so far [illegible] idea of a curse, that it should not be forgotten [illegible] the many blessings of mankind.

NEW INDUSTRIES FOR [illegible]

TO THE EDITOR OF THE "BO[illegible]

SIR,—There are many raw materia[illegible] which, manufactured in foreign cou[illegible] Their use is very costly. Before [illegible] Bombay, we used to consign almo[illegible] England and Europe, where it [illegible] by us to cloth so woven was supplied us at [illegible] and the land. But now we have been [illegible] than in England same kind of cloth at a very [illegible] ourselves with the such use of our cotton as co[illegible] Yet we do not make lar description of cloth is [illegible]; for only one particular ventured to turn out clo[illegible] here, and no one has yet are thus still dependent [illegible]rent textures and kinds. We quantities myrabolls [illegible] England. India produces in large England in imm[illegible] other articles which are exported to form of pa[illegible] quantities, and which return thence in the very [illegible] Many useful articles of Indian growth are thus [illegible] utilised by foreign manufacturers. Thus we supply [illegible]edients; and, to our great chagrin, we buy the same, though in a different form, at a rate very much dearer than that we have supplied at. If the natives of India were to know how to make the right use of the products of their own country, they would, no doubt, put themselves in an enviable position in the eyes of foreign nations. Possessed of the great advantage of cheap labour, they ought to enter into a formidable competition with almost all the countries of the world. It is worth anybody's while arguing on, and drawing attention to, a subject which has more or less escaped the notice of enterprising people in India.

Those who have visited the fertile lands of the Punjab must have been surprised at the fat, plump sheep that are found there. As we get near the hills, the wool so found is so soft and smooth as to rival any other kind of wool in any market of Europe or that of Australia. But the great pity is, that this most valuable article is thrown way, or uncared for like any rubbish, in a thickly populated place. Cashmere shawls are famous all over the world, and the only occupation of the people of Cashmere and Amritsar is to weave shawls with their own hands. No one has yet thought of working the material by machines. Perhaps the shawls made by machines would not be so strong and good in texture as those now being worked by hand. Why not then open mills in the Punjab or Bombay for the manufacture of shawls, rugs, and blankets, and many other articles of daily use? In weaving shawls, coarse rugs, and blankets by hand, much time is lost, and the consequent cost is much greater; but if they were manufactured by means of English machinery, I venture to say that they could be made, if not more, at least equally stout, durable, and far more cheaply. It is true that rich Cashmere shawls of the best quality could not be manufactured by us, because we can never hope to gain the practical skill in their manufacture which the artists of Cashmere can command; and supposing for the nonce that we did possess their peculiar skill, there can never be a large market for any shawls other than those of Cashmere, simply because the shawls of Cashmere have been universally renowned. Yet I dare say that we could make large profits by making coarse rugs and blankets by machinery. We who inhabit warmer climes can have no idea of the necessity there is among those who live in cold regions for coarse rugs and blankets. They are greatly prized by those who have to do out-door work in winter, such as the police and military. It might be asked, why should there not have been a great demand for the rugs and blankets made in the Punjab for the use of the army, if they are said to be so very valuable? But invariably the demand for a certain article in the market is regulated by its cheapness, and not its value in use. At present all classes of people could not afford to pay for them, owing to their scarcity and dearness. If these articles were manufactured on a [illegible] ale, their prices would necessarily fall, that people from [illegible] would come forward to purchase them. Again by the aid [illegible] h machinery, and through the exertions of intelligent [illegible] tists, we might be able to manufacture such excellent [illegible] lankets from the Punjab and other wool, that we should [illegible] to meet the vast demand which would arise for [illegible] country-made rugs and blankets are so coarse and unsightly that their manufacture can be vastly improved by means of mechanical labour and English skill.

Apart from the demand of foreign countries, the want that is felt by the Indian army alone is so great that the woollen cloth turned out by the English machinery would not prove sufficient to meet it. A mill of this description, the Egerton Woollen Mills, was a short time ago opened in the Punjab. Though it is only two years since it was started, it has been showing good earnings. It is the opinion of one of our Commanders-in-Chief that the out-turn other would beat even the stuff manufactured in England. It imparts a great deal of warmth at a cheap price. Men of experience say that if the Punjab wool were properly worked and utilised, excellent rugs and blankets might be made there, such as might stand against the most bitter cold of England or Cabool.

This is the right time for the people of India to launch into such enterprises, profitable and useful, to all intents and purposes. This is, again, a fit opportunity for the encouragement of such enterprises, as the Viceroy is particularly interested in the development of commerce, the encouragement of trade, and the refinement of native arts and manufactures. Yours, &c.,

[illegible] SERWANJEE SHERIARJEE GINWALLA.

BROACH, June 28.

P.S.—In a letter which I recently received from Mr. Sheppard, the Commissioner for the Northern Division, he writes:—"The Egerton Mills, the Cawnpore Mills, and others are, I believe, doing a large business. I have bought cloth from the former for the great-coats of the police force in this division, and it is excellent; but I do not know whether Indian [illegible] is used, or Australian."

FIELD EXPERIMENTS AT WOBURN.

On Thursday, the annual visit of inspection of the Royal Agricultural Society to the Experimental Farm on the Duke of Bedford's estate at Woburn embraced a numerous company; numbers, indeed, coming from remote counties—including Mr. William Wells, an ex-President of the Society; Sir J. B. Lawes, Mr. R. M. Knowles, of Colston Bassett; Mr. Thomas Bell, from Newcastle-on-Tyne; Mr. Charles Clay, from Wakefield; Mr. Alfred Sutton, from Reading; Professor Jamieson, from Sussex; Mr. H. M. Jenkins, Secretary of [illegible]; Dr. John Augustus Voelcker, consulting chemist; Mr. [illegible]ers, consulting botanist; Mr. Robert H. Warington, F. C. S., [illegible] E. Bear, &c. Universal gratification was expressed at the luxuriance of the spacious plots of growing wheat and barley, alike in the [illegible] crops in ordinary farm management and those grown by artificial manures, and compliments were fairly earned by Dr. Voelcker, for his admirable direction, and by the farm manager, Mr. Fraser (who has succeeded Mr. Malden), for his competent and diligent execution of the details of the scientific husbandry.

In the trials of artificial manures, it is palpable that the results of former years will be forcibly repeated at the harvest of 1885; the wheat dressed with ammonia salts is far ahead of those dressed with mineral manures, which latter, indeed, are little fuller or forwarder in appearance than the poverty-stricken wheats which are entirely unmanured. And again it is ascertained in practice that the half-plots which are left unmanured, after having had a heavy dressing of artificials last year, feel little benefit from it, no evidence being apparent of any residue of fertility from the manurial application of last season. This, of course, is to be understood as true of the Woburn sandloam soil.

The wheat grown on the rotation division is of almost unequalled bulk and luxuriance for the present season; and this both on the cotton-cake-manured, the maize-meal-manured, and the artificial-manured plots. The object of these field trials has been to test the comparative manurial value of cotton-cake and of maize-meal. Sir John Lawes, basing his estimates upon chemical analysis, calculated in 1875 a table of money values of manurial residues from different foods, fixing (at the then market prices) cotton-cake as worth £6 10s. per ton, and maize-meal as worth only £1 11s. per ton, in the manure (unwasted) from animals fed on those materials. Strange to say, it has been found, from two consecutive trials of four years each—that is, eight years' experience—cotton-cake shows no decided superiority over maize-meal, nor does artificial manuring with the chemical ingredients of cotton-cake dung give a better result [illegible] crop than dressing with the chemical ingredients of maize-meal dung. Hence, referring to the Woburn experiments instituted [illegible] the late Dr. Voelcker, his son, Dr. John A. Voelcker, speaking at a late meeting of the Farmers' Club, said, "the results furnished have been quite contrary to what his father expected, and such as he himself could not have foretold." The series of practical results in eight years have been as follows:—

WEIGHT OF ROOTS PER ACRE GROWN BY

Year.		Farmyard Manure from Cotton-cake.		Farmyard Manure from Maize-meal.		Artificial Manure equivalent to Cotton-cake.		Artificial Manure equivalent to Maize-meal.	
		Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
1877	...	3	17	2	1	7	4	3	16
1878	...	13	2	11	16	18	13	12	15
1879	...	4	10	4	9	7	19	6	15
1880	...	19	10	18	19	24	10	20	13
1881	...	22	6	21	14	24	7	21	13
1882	...	17	6	17	1	19	13	18	8
1883	...	20	0	20	4	23	7	20	13
1884	..	14	10	13	13	16	10	16	14
Average of eight years		14	7	13	14	17	15	14	18

YIELD OF BARLEY PER ACRE, GROWN AFTER THE ROOTS CONSUMED ON THE LAND BY SHEEP.

Year.		After Roots from Cotton-cake dung. The barley not manured.	After Roots from maize-meal dung. The barley not manured.	After Roots from artificial manures equivalent to Cotton-cake dung. The barley also top-dressed with artificials.	After Roots from artificial manure equivalent to maize-meal dung. The barley not manured.
		Bushels.	Bushels.	Bushels.	Bushels.
1878	...	41·3	38·8	51·4	36·4
1879	...	33·0	40·0	45·7	32 8
1880	...	41·3	37·0	41·0	33·4
1881	...	50·6	47·3	51·0	51·0
1882	..	51·3	48·1	46·6	46·3
1883	...	54·4	60·0	60·5	57·8
1884	...	50·4	50·1	53·8	47·5
Average of seven years		46 0	45·9	50·0	43·6

Seeds followed the barley, and the relative production was measured by the amount of increase in live-weight of sheep which grazed the crops grown upon the several plots.

YIELD OF WHEAT PER ACRE GROWN AFTER THE GRAZED SEEDS.

Year.		After [illegible], sheep [illegible] with [illegible]	After seeds, sheep grazed with maize meal.	After seeds, sheep grazed, with no added food. The wheat top-dressed with artificial manure equivalent to cotton cake.	After seeds, sheep grazed with no added food. The wheat top-dressed with artificial manure equivalent to maize meal.
		Bushels.	[illegible]	Bushels.	Bushels.
1878	...	41·0	[illegible]	50·6	39·4
1879	...	39·8	40·0	[illegible]	41·7
1880	...	22·0	23·2	[illegible]	25·1
1881	...	56·4	57·4	58·9	[illegible]
1882	...	42·8	43·3	42·4	46·1
1883	..	46·1	46·2	44·8	46·1
1884	...	51·5	52·3	47·4	52·2
Average of seven years		42·8	44·1	44·4	43·7

It we assume a standard money value per pound, ton, or bushel, for the several products, the comparative value of the total produce raised may be stated thus:—

COMPARATIVE MONEY VALUE OF PRODUCE FROM THE COTTON-CAKE AND MAIZE MEAL ROTATIONS.

COTTON-CAKE ROTATION.

	Average Produce per Acre.	Assumed Price.	Estimated Money Value, per acre.		
			£	s.	d.
Roots	14 tons 7 cwt.	10s. per ton	7	8	6
Barley	46·0 bushels	7s. per lb.	9	4	0
Sheep-grazed seeds ...	363lb. of live weight	7d. per lb.	10	10	11
Wheat ...	42·8 bushels.	4s.6d. per lb.	9	12	7
Total value, eight years average ...			£36	11	0

MAIZE-MEAL RO[illegible]IONS.

	Average Produce per Acre.	Assumed Price.	Estimated Money value per Acre. £	s.	d.
Roots	18 tons 13 cwt.	10s. per ton.	8	16	6
Barley	45·9 bushels.	4s. per bl.	9	3	7
Sheep-grazed seeds ...	356¼lb. of live w'gt.	7d. per lb.	10	7	11
Wheat	44·1 bushels.	4s. 6d. per bl.	9	18	5
Total value, eight years' average			£ 36	8	5

To account for this discrepancy between science and practical realization chemists have alleged that the comparative nullity of effect from nitrogenous matter in the cotton cake and in its equivalent artificials, is due to the large amount of unexhausted manure still remaining in the sand—which is a very light sand of about 9in. depth upon almost pure sand. It is for them to reconcile this theory with the fact that on the artificial manure plots in the selfsame field the effect of nitrogenous manures has been found to be as marked as in ordinary experience upon stronger soils. A change in the experiments has been introduced, with a view of exhausting this supposed unexhausted store of manure in the land; this time, last year's wheat is being followed by man-golds unmanured and by Swedes grown with only 3cwt. per acre of superphosphate, and last year's barley is being succeeded by peas and tares grown without manure. Next year will, then, show if on the more exhausted ground-maize, meal dung will continue to give as high a result in crop as the dung from cotton-cake.

An experiment in feeding cattle on silage against others fed on roots and hay-chaff has been conducted since January 29th. In the first 60 days the animals increased 1lb. per head per day, on silage, but 2 1-3lb. per head per day on roots and hay-chaff; and in the 60 days, April 2 to June 1, the gain on silage has been ½lb. per head per day, and on roots and hay 2 1-5lb. per head per day. This is so contrary to a wide experience elsewhere, that critics challenge the experiment as vitiated by the sickening of the animals with too large quantities of the wet sour silage, or the giving of cotton cake as an astringent food at the same time as the silage, which is also astringent, or to the ma[illegible]er in which the food has been supplied. This will be duly sifted, [illegible]o doubt, by the Ensilage Commission in Parliament-street.—*Ti*[illegible]

RHEA-RAMIE (CHINA GRASS) SUPPLY COMPANY, LIMITED.

UNDER this title, Messrs. G. W. H. Brogden and Co., as patentees of the Favier-Fremy processes, are promoting a Joint Stock Company with a capital of £200,000 in shares of £50 each, with the object of ensuring to manufacturers a regular supply of Rhea-Ramie (China grass) ready for spinning, rendering this country independent of the importation of flax and hemp from all sources except British colonies and dependencies. Our readers will recollect that in the early part of last year, a draft prospectus of the Johore Rhea Company was privately circulated, its object being to purchase 20,000 acres of splendid land in Johore on which to cultivate the fibre, and this project has been merged in the larger one of the China Grass Supply Company. The operations of the company as at present contemplated, [illegible] comprise—

No. 1—The purchase of ribbons where[illegible] prepar-ing the *filassy* for manufacturing purpos[illegible] otherwise.

No. 2—The ungumming in this cou[illegible] elsewhere, by the Fremy-Urbian, or other process[illegible] ribbons so purchased or produced by the company[illegible]ants and licensees, converting the same into [illegible] for the manufacturer.

[illegible] cultivation of land in Johore and Venezuela, and granting leases to the Chinese and Natives, and subsequently purchasing their produce of Rhea, converted into ribbons.

No. 4—The granting licenses in the numerous colonies and dependencies of Great Britain. A license has already been granted to the Glenrock Company, Limited, for the South-East Wynaad. Negotiations are also progressing for the whole of India, Ceylon, and Mauritius.

We understand that the Manchester manufacturers have taken up the enterprise very heartily, and that of the 4,000 shares at £50 each, constituting the capital of the company, not more than 1,000 shares will be offered to the public. Mr. Casper, a partner in the firm of Messrs. Brogden and Co., recently delivered a lecture in Manchester on the subject, under the presidency of Mr. J. H. Hutton, chairman of the Chamber of Commerce, and the liveliest interest was displayed by the audience, which consisted almost entirely of mill-owners, merchants, &c., engaged in the textile industry. Mr. Casper explained at some length the nature of the plant, dwelling upon the ease with which it can be propagated and grown, and explained that large blocks of land specially suitable for its growth had been secured in Johore and Venezuela. A large portion of the land in Johore lay on both sides of a river navigable to the ports of Johore and Singapore at all seasons, and there were six crops a year. The delay which had taken place in the popularising of the fibre arose from the difficulties and expense attendant on its treatment to prepare it for use, but processes had somewhat recently been discovered which removed this difficulty, and now the fibre could be delivered chemically pure, ready for spinning and dyeing. From the date the plant was cut off until it was delivered to the manufacturer a week need not elapse, and the company, if formed, could insure a supply of at least a thousand tons a month. The material could be laid down cheaper than any present one—flax, cotton, or hemp—and it had qualities infinitely superior to any of them. It lent itself to almost any purpose, being on the continent made up into all sorts of things, and it was remarkable alike for strength, for delicacy and for finish. Some people had said that it would not take dye, but on the table were a number of samples which had been dyed in Manchester. Those who were moving in this mat[illegible]cured some thirty square miles of land, and had acquired very valuable concessions and privileges. What they wanted now was money to enable them to cultivate the plant, and to the company which it was proposed to form, Sir Joseph Lee had promised to subscribe.

We have from time to time published information as to th progress made by Mr. Minchin in the cultivation of Rhea on th Glenrock Company's estates, but we are glad to find the success of the experiment fully confirmed by Mr. Jennings, the secretar of the company, in a letter to Messrs. G. W. H. Brogden and Co wherein he says:—

"Beginning in May last with about 2,000 plants by means of root and stem cuttings, and separation of roots, our manager, Mr. J. W. Minchin, has been able to report that in Decembe he had increased his stock to over 300,000 plants, hoped by the following monsoon to have about 200 acres planted. Nothing could have been more satisfactory such a result of a single season's operations. Of c[illegible] everything has been sacrificed to propagation [illegible]ch a low have been allowed to mature; as soon as pos[illegible]ally given up and divided, and in this way a single pl[illegible] such people produced thirteen strong-growing cuttings. The system of evidently suit the plant admirably, and during [illegible] under British a portion of the acreage under rhea will come [illegible] strained to mature stems will be decorticated by steam, a[illegible] was received home to test the commercial value of the new [illegible] were already

"You will also be pleased to learn that five miles from ning to take [illegible] lively interest in rhea, [illegible]u known to many willing to [illegible] with our plan of private [illegible]g monastery, but by which [illegible]eans we hope to extend the c[illegible]n to the officials. ably, [illegible] think you may now accept it [illegible] which led to the hi[illegible]nce exists to the successful cult[illegible]pply future trouble, [illegible]dia, and if the subsequent tr[illegible] 1883 must have [illegible] to equally successful, the result pro[illegible] millions! India and lucrative to those enga[illegible] good proof of the [illegible]lanters' *Gazette*, English paper.

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CHINA GRASS, OR [illegible]ATION.

As the season is now ap[illegible] for the collection of the year's crop of stems on new [illegible] plantations, it may be as well to point out to grower[illegible] no machine for the extraction of the fibre is requir[illegible] prepare it for the market. The selection of the fibre [illegible] for trade purposes may be continued daily throughout [illegible]ear, with only a short interval of rest in the winter months, in tropical or sub-tropical plantations, or from June to October in more northerly latitudes.

All that is needed is to collect the stems as they attain a standard length of three feet six inches. The women and children on the estate may cut them from the groups of growing plants as they attain this size; and as these newly cut stems are very succulent, they can be readily divested of their leaves by drawing each stem through the closed hand, and then, by simply inserting the thumb nail between the green bark and the stalk, about the middle of the stem, the bark containing all the available fibre can be readily peeled off. The now useless peeled [illegible] can be thrown in a heap to be reduced to ashes by setting them on fire when dry, and this valuable fertilizer can be heaped up about the roots of the growing plants, or it may be covered with mould to swell the manure heap. The strips of thin bark must be carefully dried in the morning sun, or hung up during the night in light bundles, for if they are exposed to the scorching mid-day rays, the gums and resins in which the delicate fibre is involved coagulate and render their fibre brittle. Too great heat or too rapid drying has almost as injurious an effect on the fibre as the absurdly fatal plan of boiling the stems—to free the bark!—would have, which has been so stoutly advocated by those who are [illegible] ignorant to the rational mode of treatment of so costly a product.

To boil a stem of rhea with a view to removing the bark has the same injurious effect upon the natural gums and resins of the plant that boiling has upon the albumen of an egg, that is to say, it renders the pellucid liquid in which the yolk floats quite opaque, as we are familiar with it in the white of egg. But the fresh juices of the plant must become discolored by the brown coloring matter contained in the bark; subjected to the action of hot water, these coagulate, and the resins turn to a dull black colour before the fibre that has undergone this needless treatment reaches its destination. All subsequent attempts by chemical treatment to eradicate this mill was only completed too late in 1884 to crush any cane during the season.

A few miles distant is the property of Messrs. Wilson Brothers, at Deuba, whose mill was set to work during 1884. Upon the other side of the island the Colonial Sugar Refining Company are opening up a very large estate for the Auckland Sugar Refining Company, which is as yet only in an "embryo" stage. Higher up are the fine properties of Penang, owned by Dr. Chalmers, at work since 1882, with most satisfactory results; and Ellington, the estate of the Hon. J. B. Leefe, whose machinery was not completed until the beginning of 1885.

In the Island of Mango, the Mango Island Company opened their mill during the season of 1884, and on Taviuni are situated the plantations of Messrs. Billyard and Co., which got to work during 1883. That all of these establishments have not fulfilled the somewhat exalted expectations of those interested during the first year of their existence, and that one marked by so disastrous a fall in the price of sugar is more than probable, especially as the original estimates were in most instances largely exceeded, but they are all at work during this season with good prospects of success so far as the crops are concerned. Let other auspices be never so favourable, the essence of success lies in competent administration, which unfortunately in several instances has not characterised the direction of estates in Fiji. Persons undertook the formation of plantations and erection and management of mills without the least knowledge of the business. Ignorant of the country and language and the organization of labour, too conceited to profit by the advice of those who possessed the requisite practical experience, they squandered the funds entrusted to them, and were themselves the true cause of the financial difficulties, which they would attribute to the inefficiency or obstruction of the Government, or to any cause rather than the real one, viz., their own incompetence.

Turning to the labour question. All those persons best acquainted with the Fijians in their own country are agreed that they cannot be relied upon as the permanent and sole source of supply for the steady regular work of a plantation, but notwithstanding the obstructions alleged by your correspondent to be opposed by the Government, many hundreds of them are still employed under longer or shorter terms of engagement, and are very valuable as a supplementary labour. For some years past owing to the heavy demand for Polynesian labour for Queensland, Honolulu, and elsewhere, the supply from the islands of the Pacific has failed, not only in quantity, but also as to quality, which has deteriorated very seriously; consequently the mortality among these people during the first few months of their engagement has been so great as to be repugnant to the sentiments of humanity, and also to largely enhance the average cost of their introduction in the country When acclimatised they are most efficient hands, either in the field or the mill, and are excellent amongst machinery.

Failing these sources, the importation of coolies from India was begun by the much abused Sir A. Gordon, who, profiting by the experience of Mauritius and West Indies, where their labour had been productive of the happiest results, established an agency in India for their introduction, under Government supervision. At first the old planters, full of ignorance and prejudice, obstinately refused to employ them; now, however, they are gladly accepted under a five years' indenture, and several thousands are now working most satisfactorily. The cost of their introduction has been reduced, and in 1884 did not amount to more than £20 per head, and will be brought even lower. Last year, too, an ordinance was passed allowing the original cost of their introduction to be spread, over the whole five years, a great boon to smaller planters, and one that it is intended to further extend in the future. Being medically inspected before embarkation, there is very little sickness among them, and under a judicious system of piece-work, they give full value for the amount of money earned, and it need hardly be remarked here, that where a large number of hands are employed, everything depends upon a proper system of organization. And as regards the administration of the Immigration Department in Fiji, the utmost courtesy and desire to oblige the planters is displayed.

A very extensive acreage of land is now owned in fee simple by European proprietors, and a still larger area could be obtained on lease from the natives upon very reasonable terms. As to the suitability of the soil and climate of Fiji for the cultivation of sugar, tobacco, and other tropical products, one need only refer to the exhaustive report of Dr. Horne, of the Mauritius, who made a complete tour of the group about five years ago, and other equally reliable and independent authorities. Two rival lines of steamers run regularly between New Zealand, Victoria, and New South Wales, and a third firm has already entered upon the field, the competition between these colonies and Fiji has reduced freights to a very reasonable level; and, as for nine months in the year, fine-weather prevails in these latitudes, the risks attending conveyance are at least no greater than in any other part of the world, a fact which is borne out by the low rates of insurance prevailing on shipments of produce.

Fiji, possessing as it does a rich virgin soil, a climate healthy and equable, where droughts and frosts are equally unknown, with fine harbours, and a supply of labour at least as cheap as is procurable in other parts of the world, and with the ever-increasing markets of the Australian Colonies within a few days' sail, offers a most favourable opening for the investment of capital; and the success of the sugar industry there is merely a question of efficient management, the more so as the production of sugar in Queensland must be seriously reduced by the labour laws, which have been made a political question to the very great detriment of the industry in that colony, and it can be asserted without fear of disproof that the success which has so far attended those estates which have been under intelligent practical supervision is capable of very large extension.

Yours faithfully,

PLANTER.

THE COAL FIELDS OF BORNEO.

THE well-known geologist, the Rev. J. G. Tenison-Woods, has recently visited Borneo, and made a careful examination of the geological formation of that magnificent island, with especial reference to the existence of coal deposits, and in an interesting letter contributed to the columns of *Nature*, he points out that there are few countries of the world, except perhaps Eastern Australia, where coal is so extensively developed as in Borneo. Thick seams [illegible] out in innumerable places on the coast and on the banks of the rivers. "In some of the streams of north Borneo, he says, he has seen water-worn and rounded fragments of coal forming the entire shingle bed of the channel. In some places, again, there are outcrops with seams of good coal 26 feet thick. The coal formation is the one prevailing rock of the coast. It forms the principal outcrop about Sarawak. At Labuan, also, no other rock can be seen. Lining the banks of the Bruni River, he only saw picturesque hills of very old carboniferous shale. All the grand scenery of the entrance to the port of Gaya is made up of escarpment of coal rocks and at K[illegible]at is the same.

"In Eastern Australia and in Tasmania, beds of coal of very different ages lie close together, and according to Mr. Tenison-Woods, it is the same in Borneo. Whether there is tertiary coal or not in the island he cannot say; but there is mesozoic coal and probably palæozoic coal, and coals like that of Newcastle in Australia, whose position hovers between the true palæozoic and the trias. The works at Labuan having been long since abandoned and the shafts having fallen in, Mr. Tenison-Woods found it next to impossible to explore the mine, but he asserts that there is plenty of coal and shale on the surface, and there are excellent sections on the sea cliffs close by The whole deposit is very similar to the Hawkesbury sandstone of Australia. Now Labuan, as our readers are well aware, is a naval coaling station. Stores of coal are sent out from England at a great expense for the use of her Majesty's navy; and if the article could be got in the island, the enormous advantages are obvious. We think with Mr. Tenison-Woods that the deposits should be further tested. About fifty miles away to the south-east, at the mouth of the Bruni river, are rocks of quite a different character and much older. They are sandstones, shales, and grits, with ferruginous joints. The beds are inclined at angles of 25 to 45 degrees. They are often altered into a kind of chert. At Moarra, there is an outcrop of coal seams 20 25, and 26 feet thick. The coal is of excellent quality, quite bituminised and not brittle. The beds are being worked by private enterprise. Mr. Tenison-Woods saw no fossils, but the beds and the coal reminded him much of the older Australian coals along the Hunter river The mines, he says, are of great value. They are rented for a few thousand dollars (by two enterprising Scotchmen) from the Sultan of Bruni. The same sovereign would part with the place altogether for little or nothing. Why not, asks Mr. Tenison-Woods, have our coaling station there? Or what if Germany, France, or Russia should purchase the same from the independent Sultan of Bruni? The Sarawak coal beds he did not visit, but a collection of fossils was kindly sent him. He recognised at once well-known Australian and Indian forms, such as *Phyllotheca Australis Vertebraria*, forms which are entirely characteristic of the Newcastle deposits in New South Wales. The connection thus established between the carboniferous deposits of India, Borneo, and Australia is exceedingly interesting, and we are glad to hear that Mr. Tenison-Woods intends to publish all the observations he has made on the coal formations of Borneo and their included fossils."—*Planters' Gazette* (English Paper.)

FOREIGN BUYERS IN BERLIN.

THERE are at the present time in Berlin representatives of the great business concerns of the whole world, who are here for the purpose of making purchases and placing commissions. Besides the great firms of North America, there are buyers from South America, the most distant parts of Central America, England, Spain, and other Continental countries. Even Africa has sent buyers, who come from Port Natal. The purpose of these visits is the same—that of making purchases of those manufactures for which Berlin has become famous. These are particularly various branches of the textile and mineral industries, which profit greatly by the presence of so many foreign buyers. To these industries must, however, be added that of the artificial flower and leaf manufacture, an industry which in Berlin has reached important dimensions. Though ten years ago Paris monopolised this business, and though German traders had then to journey to the city on the

Seine for the purpose of supplying their wants in this direction, Berlin is now supreme in the market. As in all branches of trade, however competition is very severe, and the supply far exceeds the demand. It is said that one single manufacturer employs more than 1,000 work-people of both sexes in various prisons, and this employment of prisoners certainly makes the rivalry to be felt more keenly by some firms. The manufacture of fancy feathers of all kinds is continually extending in Berlin, and just as with artificial flowers it out-distances French competition. Fashion at present favours these articles. The export business grows rapidly. North America being an especially large buyer, The feathers in light colours made here are, by virtue of a peculiar process of preparation, preferred greatly to those of French manufacture. The inland, and particularly the export, business gives manufacturers satisfactory employment.—*Kuhlon's Review.*

GUANO.

By Dr. A. P. Aitken,

Chemist to the Highland and Agricultural Society.

The name guano is a Spanish word, signifying dung, and it was originally applied in this country to denote the valuable deposit, consisting chiefly of the excrement and carcases of sea birds which roost and nest upon the Peruvian shores, and feed upon the fishes that abound in the warm waters of that district. The remains of these birds had remained undisturbed for thousands of years, and formed deposits which in some districts were more than 100 feet thick. The first sample that arrived in Europe, was brought by Humboldt about the beginning of this century, but it was not until about the year 1840 that its great value as a fertilising agent was appreciated in the old world. From that time, and for more than thirty years thereafter, it was brought over in enormous quantities, so that the imports into the United Kingdom averaged about 200,000 tons per annum. The first imports were of a highly nitrogenous kind, yielding as much as 15 per cent of ammonia and sometimes more. These were deposits obtained from the Chincha Islands, a region in which rain is almost unknown, and where the heat of the sun is so great as to rapidly dry up the material and preserve its soluble constituents from deterioration. These rich deposits were soon exhausted, and attention was then directed to other parts of the coast, where deposits were found whose soluble nitrogenous materials had been to a greater or less extent washed away by rain and the spray of the sea.

During the last decade a great deterioration has occurred in the quality of the guano imports—the highly nitrogenous deposits are now exhausted, and the genuine Peruvian guanos now imported do not yield more than about 5 per cent of ammonia on an average. Corresponding with this decrease in ammonia there is a decrease of soluble phosphates, but the total phosphates are very much increased, so as to average upwards of 45 per cent. On some parts of the coasts where rain is abundant, the nitrogenus constituents of the guano are entirely washed away, and the result is what is called a phosphatic guano, containing from under 50 to over 70 per cent of phosphate of lime; but these deposits are also fast disappearing. Owing to the large proportion of soluble constituents in the original guanos, they were very powerful manures. Their effect upon the crops to which they were applied was simply marvellous, and it was with some difficulty that farmers were able so to restrain their use as to prevent injury being done by too liberal application. Even during recent years, when the quality of the imports has so sadly deteriorated, a charm still lingers around the name of Peruvian guano, so that farmers are willing to pay a price for it which is much above its manurial value. The present imports of Peruvian guano, containing about 5 per cent ammonia and nearly 50 per cent phosphates, are, nevertheless, excellent manures, and capable of being used with greater freedom and safety than the powerful guanos of former years.

The charm surrounding the name of Peruvian guano has led manufacturers during recent times to manipulate the low-class guanos now imported so as to give them the appearance of the imports of former years. The deficiency of soluble nitrogenous matter is made up by adding sulphate of ammonia, and the result is that the mixture is able to fetch a price far beyond its intrinsic value. Sophisticated guanos of that kind are sold under various names. They are sometimes called 'standardised,' or 'equalised,' or 'prepared' guanos, and other names more or less occult are frequently applied to them; but under whatever pleasant name they may be advertised, the fact remains that they are low-class guanos, such as are now imported, to which sulphate of ammonia or some other highly nitrogenous stuff has been added. They are sometimes sold without any qualification, but that is simply a fraud. There are still some small residues of high-class ammoniacal guanos to be found in the country, but they are not likely to be bought at prices that would be profitable for ordinary farm purposes, and any one who buys a high-class guano should be careful to see that it is genuine. The composition of Peruvian guano, as now imported, somewhat resembles that of bones, only it is more active manure.

Dissolved guano has long been before the public, and the best kinds of it were no doubt very excellent manures. They were sometimes sold as 'ammonia-fixed guanos,' and at the time when high-class guanos were being imported in a somewhat wet state, the addition of sulphuric acid to them was a very sensible practice; but nowadays the amount of ammonia in guano is too small and of so fixed a character, that it requires no artificial fixing. The dissolved guano of the present day will contain about 2 or 3 per cent of ammonia, and of course a large proportion of soluble phosphate. If it contains a high percentage of ammonia, it is most probably a mixture, and it may be a dissolved compound containing no genuine guano in its composition.

The name guano has now come to be applied to various substances which have no claim to the title. Fish guano is one of these. It consists of the dried offal of the fish-curing yards, or some other preparation of the dried substance of fish. Its phosphatic and nitrogenous matter are both insoluble, and it forms a very slow-acting manure. The fine form in which many of these fish guanos are presented in the market leaves nothing to be desired. They are very attractive manures, and it is unfortunate that owing to their oiliness and other causes, they are slow to decompose in the soil, and are very disappointing in their results. Such manures would be greatly improved by being dissolved, but the large amount of organic matters they contain, makes it impossible to dissolve them to any great extent. Any manufacturer who should discover a method for quickening the action of fish manures would bestow a boon on agriculture, for the utilising of fish manures is the great means of restoring to the land the enormous amount of nitrogenous matter which is constantly being carried down from the land into the sea.

Frey Bentos guano is another manure which has had an erroneous name applied to it. It has no claim to be called a guano, as it consists of the offal of animals slaughtered for the sake of their marketable products, such as extract of beef, hides, gelatine, &c. This substance, like the former one, is of little use when applied alone; but, nevertheless, it forms a very useful ingredient in a dissolved manure when it has really been dissolved, and not simply mixed with it in its insoluble form.

There are many other manures sold under the name of guano that ought never to have had the name applied to them, and the sooner they are sold under legitimate names the better, for guano is a name which applies only to excrementitious substances which have passed through the digestive system of an animal.

Bat guano is the excrement of the bat, and in that respect may be considered a guano. It contains much organic matter, but is low in phosphates and ammonia.

Ichaboe guano is a genuine guano of recent formation. It is a highly nitrogenous manure, but much of its nitrogen is in the form of feathery material, which comes only very slowly into action. This also is a substance which would be improved by being dissolved but it cannot be dissolved to any great extent. It is much sought after as a manure, and when applied early, is a good constituent in a mixture which is intended to nourish a crop whose life is of long duration. As it is a recent deposit, and restricted in its area, the supply is very limited, and much behind the demand.

The genuine phosphatic guanos, such as Maldon, Baker, and Mona guanos, are simply phosphatic manures having the analysis of various kinds of mineral phosphate; but they possess one great advantage over these in having been at one time dissolved to a considerable extent, and they are in some measure composed of precipitated phosphates, which, although it is insoluble in water, is nevertheless rapidly dissolved by the acids in the soil and the solvent action of the roots of plants.—*North British Agriculturist.*

DISSOLVED BONES.

By Dr. A. P. Aitken,

Chemist to the Highland and Agricultural Society.

Bones coarsely crushed had not long been in use as a manure, before it was found that their efficacy was greatly enhanced by dissolving them to some extent in sulphuric acid. That was a very important discovery, which not only marked an epoch in agriculture, but gave rise to a new industry, which has now assumed large proportions, and indirectly had a beneficial influence on the whole manufacturing trade of the country. Its immediate effect as regards the use of bones was to transform them from a slow into a quick-acting manure, capable of being applied with advantage to crops whose period of growth was of short duration. It enabled farmers very considerably to reduce their expenditure in the purchase of bones, for it was found that one bushel of bones when dissolved with acid produced a far more immediate and powerful effect upon the crop than two or three bushels of crushed bones; and as the price of bones rapidly rose in proportion as their use became more general, this discovery was a great boon to agriculture. Farmers bought sulphuric acid and dissolved the bones themselves, but as this was a troublesome operation, and not unattended with danger, a class of men arose who made it their business to dissolve bones and supply farmers with the finished article. This was the beginning of the manure manufacture, and it was not long before it was found that coprolites and all other phosphates were capable of being dissolved in a similar manner so that superphosphates and other dissolved manures came rapidly into existence. The great promoter of this new industry was Sir John Bennett Lawes, who not

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VOL. X.] CALCUTTA :—SATURDAY, AUGUST 1, 1885. [No. 31.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING JULY 22, 1885]

General Remarks.—Rain is reported from the Madras Presidency generally, and prospects, which are elsewhere fair, have much improved in Bellary and are more favourable in Anantapore. More rain is still wanted for the crops in parts of Bellary, Ganjam, and Tanjore. In Mysore slight rain fell in most parts of the State, but more is required. Prospects are uncertain in Kolar and in the lowlying tracts of the Shimogra and Kadur districts; elsewhere in the province prospects are, on the whole, favorable. In Coorg there has been a good deal of rain, and prospects continue favourable.

Good rain has fallen throughout the Bombay Presidency, and prospects have greatly improved. More rain is required for sowings in Khandesh and in the Panch Mehals. *Kharif* sowings are in general progress. Rain has fallen throughout the Berars, in Hyderabad, and the Central India and Rajpootana States, and prospects are, on the whole, very favourable, though in Marwar, considerable anxiety is said to prevail on account of the scanty rainfall. In the North-Western Provinces and Oudh, in the greater part of the Punjab, and in the Central Provinces rain has been general, and *kharif* operations are in active progress.

Good rain continues to fall in Bengal, and agricultural prospects are favourable in all districts. The autumn crops and sugarcane promise well, except in some places where they have been damaged by floods. Harvesting of early rice and jute has begun in parts of Northern and Eastern Bengal, and the transplanting of late rice is going on well. Good rain is reported from Assam, and the state and prospects of crops continue favourable.

In British Burmah the weather is seasonable; and ploughing, sowing, and transplanting are in general progress.

The public health is fairly good in most provinces, and prices are generally stationary, except in the Punjab, where they are rising in Ferozepore and Peshawur. In Bengal prices are still high.

Madras.—General prospects fair, much improved in Bellary and better in Anantapore.

Bombay.—Good rain throughout the presidency. Prospects greatly improved; more rain required for sowing in parts of some districts especially Khandesh and the Panch Mehals; rice transplantation progressing; standing crops injured by insects in parts of Upper Sind Frontier; fodder is scarce in parts of Nasik and Ahmednugger. Cholera in parts of seventeen, and fever, small-pox, and cattle-disease in parts of eight districts.

Bengal.—There has been general rain during the week, and agricultural prospects are favourable in all districts; more rain is wanted in Moorshedabad. Autumn crops and sugarcane are generally very promising, except in a few localities where some damage has been done by floods; transplanting of late rice progresses well; harvesting of early rice and jute has begun in parts of Northern and Eastern Bengal; in spite of the present good prospects of the crops, the price of rice remains high and shows no signs of falling. General health continues to be fair. The earthquake on the morning of the 14th instant was felt all over the Lower Provinces.

N. W. Provinces and Oudh.—Rain has been general throughout the provinces; in Aligurh the fall has been extremely heavy, causing damage to crops. *Kharif* operations in progress, and prospects seem favourable. Markets are well supplied, and prices fairly steady. Public health generally good.

Punjab.—Rain in most districts. Slight cholera in the Goorgaon district, in the Chunian tahsil of the Lahore district, and in the city and cantonment of Rawul Pindee; elsewhere, health is generally good. *Kharif* sowings in progress. Prices of food-grains generally stationary, rising in Ferozepore and Peshawar districts.

Central Provinces.—Good rain with favourable weather for agricultural operations. Cholera continues in Chuttisgurh and in two other districts. Prices steady.

British Burmah.—Cholera severe in four, and slight in four, districts; small-pox slight in one district, elsewhere public health good; cattle-disease severe in two and slight in three districts, elsewhere health cattle good. Ploughing, sowing, and transplanting progressing. Re seasonable.

Assam.—Weather warm. Some damage done to *damahi* and *murali* crops by insects; transplanting of *aus* crops nearly finished; ploughing for *sali* crops progresses; prospects of tea favourable. Common rice 13¼ seers per rupee. 8 deaths from cholera from Lakhimpore and 1 from Hailakandi reported: general health otherwise good.

Mysore and Coorg.—Coffee and cardamom crops in good condition. Prices of food-grains slightly fallen. Prospects of season and public health good.

Berar and Hyderabad.—Standing crops good. Cholera continues in some places, otherwise general health fair. Prices—wheat 14¼, coarse rice 12½, white *juar* 19, yellow *juar* 23, and *tur* 15¼ seers per current sicca rupee.

Central India States.—Weather cloudy and warm; health and prospects good.

Rajpootana.—Good rain throughout the districts; tanks and wells fair. Fever prevailing; health otherwise good. Sowings continue. Prices stationary. Weather hot and cloudy, with high winds.

Nepal.—Prospects of crops good. Cholera continues.

Letters to the Editor.

MANGOES.

TO THE EDITOR.

SIR,—Having had some years' experience in Bengal as an agri-horticulturist, during which time a large number of plants raised from the seed of grafted mangoes passed through my hands, I can assure your correspondent "C. R. V." that the trees of which he complains will bear fruit. Let him to try the following simple method :—Loosen the soil round the roots about six inches, and remove the old, and fill up with fresh earth. Having done this, sprinkle a basket-full of pigeons' dung (about a seer) round the roots; then water regularly for a week. This will, I think, meet the case. If, however, pigeons' dung is not procurable, mix cow-dung with fresh lime, in equal proportions, and use as recommended above.

HEM CHUNDER DUTTA.

July 26, 1885.

MANGO INSECT PESTS.

TO THE EDITOR.

SIR,—With reference to the question put by your correspondent regarding the larvæ of some insect which destroys the mango fruit, I regret to say I have not studied the habits of this insect, as in the North-West and Oudh mangoes are not often injured in this way, but peaches are. I think it probable that it may be a moth which deposits its eggs in the flower, and when they hatch they work their way into the young fruit, as it sets, and grow with it, and ultimately emerge from the ripe fruit. If some of the mangoes containing the larvæ are sent to the Director of the Entomological Department of the Indian Museum, Calcutta, he may take steps to secure the perfect insect, when it emerges, and throw some light on its habits, whether a moth or a beetle, which would be a great step. I might also suggest that some one should, during the flowering and setting season, endeavour to observe what insects—moths especially—visit the mango flowers, either by day or after sunset. They might be able to observe with a large magnifying glass what they are about if they see any. As long as only a few mangoes are spoilt by these insects, it does not much signify, but when the fruit of a whole district is thus destroyed, it is time to study the cause and search for some remedy. If the insect deposits eggs on the young ovary, either before or after setting, some insecticide syringed over the young fruit, *when set* (not while the flower is in pollen) might destroy the eggs or young larvæ before penetrating the young fruit. Tobacco juice in water is often used for destroying insects on plants; caustic ashes in water, and other solutions might be tried. Of course, the insecticide should not damage the fruit also. But the first step is to get a clue to the natural history of this insect whatever it is. As it destroys so much fruit, there can be no harm done by making some experiments with a garden syringe or pump, and noting the side of the tree, or the whole tree on which experiments have been tried. Some of the very young fruit should be examined with a good magnifying glass to ascertain whether there be any evidence of a hole or broken surface, through which the minute larvæ may have crept in, and also to cut open the very young fruit and explore it with a glass in every way. In short, to obtain a clue how this insect gets into the mango fruit, and when, and then endeavour to work out its history. If the study of entomology has any uses at all, a great one is to discover a remedy against the worry insects give us, and the loss they entail. But until we learn something about their "manners and customs," we may be only wasting time in fruitless attempts to circumvent them. Another observation is worth making—are all the mangoes in the districts named attacked by this pest? If there be some which are *not*, then the seeds of those only should be sown there, and grafts from those only taken. The extreme dampness of the climate of those districts may facilitate the ravages of this insect. Other kinds from up-country, such as the *solid* fleshed ones, *safida*, *bhadania*, and others might be also tried there. There may be a hundred dodges by which one can oppose these little pests. Depend upon it, there is nothing worth doing in this world which can be done without trouble, and if a thing is worth doing at all, it is often worth one's while to take a great deal of trouble about it.

E. BONAVIA, M.D.

ENSILAGE vs. GREEN FODDER.

TO THE EDITOR.

Sir,—As you have been good enough to publish my hints on ensilage, as also to comment upon them in another part of your valuable journal, I venture to send you a letter in support of the theory which you question, *viz.*, that ensilage cannot be so nutritious as the fodder from which it is made. I shall first quote Dr. Aitkin's remarks in the "Transactions of the Highland and Agricultural Society of Scotland." After admitting that some coarse kinds of fodder, such as maize, when put into a silo are rendered softer or more palatable, he goes on to say that this cannot be said of clover, vetches or sweet grasses—"any change which they may undergo in a silo cannot be of a constructive or elaborative kind, but rather of a destructive kind. Construction is the work going on in the body of the living plant, the materials out of which its tissues are made are derived from outside of it, from the soil and from the air, and the moving power which builds these tissues up is the energy of the sun's rays. When the plant is cut down, and crushed into a dark pit, any changes which can occur are not those of building up but rather of breaking down." Experiments by the late Dr. Voelker, by Weiske in Germany, and by Professor Kinch at Cirencester, all show that there is not only loss of solid matter during fermentation in a silo, but that the albumenoids or flesh-formers are partly degraded into amides-amido acids, and other forms of nitrogenous matter, which are less nutritious than the true albumenoids found in the original fodder from which the ensilage was made. In some experiments made at Washington by Mr. C. Richardson, chemist to the Agricultural Bureau in America, on silage made from maize, it was shown that the percentage of non-albumenoid nitrogen in the silage was double that found in the green maize. I do not understand how the conversion of starch into sugar by fermentation enhances the feeding value of fodder: for the same process is effected by the saliva of all ruminants while they chew the cud. In conclusion, I should be glad to hear the name of any chemist who holds that pitting fodder improves its feeding value.

D. B. ALLEN.

Camp Behar, July 26, 1885.

Editorial Notes.

The Financial Department of the Government of India notifies that in the calendar year 1886, there will be offered for sale 54,000 chests of Bengal Opium, at the rate of 4,500 chests each month of the year. Of these 4,500 chests, 2,350 will consist of Patna, and 2,150 of the Benares drug.

⁂

The system of ensilage has been found to render even nettles fit for food, as we learn that Vicomte Chezelles, the French nobleman who gave evidence before the Ensilage Commission, is accustomed to place large quantities of nettles in his silo, and states that the silage they yield is not only highly nutritive, but that the stock eat it readily.

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The quantity of tea exported from China and Japan to Great Britain, from the commencement of the season to the 2nd of July, was 49,170,477lbs., as against 49,257,920lbs., exported in the corresponding period of last year. The exports to the United States and Canada during the same period were 6,790,605lbs., as against 7,654,678lbs.

⁂

There is no improvement visible in the trade of Australia during the month of June last. With reference to the exports from Melbourne, it appears that, but for the large shipments of gold, the returns would have been much more unfavourable. In fact, as they now stand, the exports show a decrease of £192,567, and the imports a decrease of £65,240, when compared with those of June 1884.

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The Gold Mines of Southern India are apparently doing good business, for we learn that the S. S. *Manora*, which arrived in Madras roads the other day from London, landed three miners —one for the Nundidroog, and two for the Mysore Gold Mines, together with a lot of machinery, &c., for the latter mine. This increase in the staff of miners is owing to the extensive work being carried on by the Chief Superintendent, Captain Plummer.

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We have much pleasure in publishing a letter from Mr. D. B. Allen on the respective merits of ensilage and green fodder. Want of space prevents our noticing the subject at length this week; but we hope to do so in our next issue. Meantime, we shall be glad to receive and publish the opinions of other agriculturists on the important point raised, as to whether fodder, when stored in a silo, gains or diminishes in nutritious constituents. The subject is an important one for India.

⁂

Mr. Buck, the Secretary in the Revenue and Agricultural Department, was to have left Simla on the 26th ultimo for Bombay. It is understood that his visit is connected with Exhibition matters. Before he left Simla there was to have been a conference of the heads of the Agricultural Department, Messrs. Fuller, Smeaton, and Crosthwaite, who had already arrived in Simla, and the other Agricultural Directors who were expected. A variety of subjects were to be discussed, and some questions in connexion with the work for the London Exhibition were to be settled.

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We have before drawn attention to the excellent effects of using a kerosene emulsion as an insecticide. The *Farmers' Review* tells now that Professor Cook, of the Michigan State Agricultural College, gives his preference to the kerosene and soap emulsion over every other kind of insecticide, when dealing with the bark louse. He makes it as follows: One quart of soft soap to one gallon of water brought to a boil, and one gallon of kerosene added to each twelve gallons of soap solution. In order to apply this, some kind of a force pump is needed.

We understand that Colonel Le Messurier, Consulting Engineer to the Mysore Government, is collecting and arranging exhibits to represent Mysore at the Colonial and Indian Exhibition. They include specimens of sculpture from Billagavi, Halabede, and Somnathpore. These are ancient, and illustrative of the old art of decorating temples. Specimens of wool fabrics will be sent from Kolar, Bevengari, and Bangalore; woollen mill carpets from Bangalore; and jail cotton fabrics from the Maharaja's spinning mill, Mysore. Jewellery will also be very largely represented.

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A contemporary has heard by wire that a Conference of the Directors of Agriculture of the North-Western Provinces and Oude, and the Punjab, was held at Simla a few days ago to discuss the question of establishing an Agricultural College at Dehra, for the improvement of the breeding of cattle, and promotion of veterinary science, with a view of preventing the ravages of disease, and consequent destruction of the cultivator's stock. These are questions of much importance, and it will be interesting to read the proceedings of the Conference, as recorded on the occasion, which we hope will be supplied to the Press for the information of the public.

⁂

A Bombay contemporary says—With regard to a resolution which appeared in our columns the other day, concerning the growth of arrowroot in this Presidency, we hear that the cultivation of arrowroot has been known in the Concan for nearly half a century. Indeed, it is supposed to be indigenous in the Concan. It was for mnay years grown at the Rutnagherry jail, and manufactured there, and for all we know, it may be still. We believe it was for some time supplied to the hospitals. The Director of Agriculture is not strictly accurate when he speaks of "wild arrowroot at Mahableshwur;" it has become wild, but it was introduced from the Concan.

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At a meeting held recently at Exeter Hall, London, under the auspices of the East Indian Association, it was stated that "much dissatisfaction exists among Indian agriculturists as to the system of taxing their improvements on land. The limitations now imposed by executive orders are said to still leave immense and altogether arbitrary powers in the hands of the Settlement Department, and the new measure for the regulation of assessment leaves the cultivators' position hopelessly insecure, and without adequate security. Agricultural improvement on any scale is said to be thus nearly rendered impracticable, and that the Government must sooner or later realise that these re-settlements and arbitrary revisions of assessment are the greatest of all obstacles."

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An enterprising man is a good pioneer, and although the Temperance Societies may not agree with us, yet we must congratulate Mr. Whymper on his new venture. This gentleman is proprietor of the Murree Brewery, and has established breweries in several parts of India. He is now, however, we learn, finding an outlet for his energies in Ceylon, and will soon be making beer at Nuwera Elyia. The plant for the Ceylon concern unfortunately lies at the base of the Berleu rocks, having been shipped in the ill-fated *Eldorado*; no time, however, was lost in telegraphing for another supply of plant, which has since reached Colombo, and will be erected under Mr. Whymper's personal supervision. It is expected that the first brew will be ready by October.

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Up to the 21st May last, the Guarantee Fund of the Colonial and Indian Exhibition had reached £189,650, of which the Government of India subscribe £20,000, the Canadian Government £10,000, the Governments of New South Wales, Victoria, and New Zealand each £5,000, and the Government of South Australia, Queensland, and the Cape Colony each £2,000.

It will be observed from these figures that India contributes the largest amount. She ought to be very well represented. But there is some fear that our anticipations may not be realised in this respect, as the management is entirely in the hands of Government officials. It is the trade that is most niterested in this Exhibition, and we cannot help thinking that the Government of India is making a mistake in excluding all private interests from the management. The mistake made in the Calcutta Exhibition was just the other way, but in that case, there were too many "cooks," who "spoilt the broth."

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We see that Indian tobacco is to be brought prominently to the front at the forthcoming London Exhibition of 1886. A letter has been addressed by the Revenue and Agricultural Department to all Local Governments, stating that a proposal has been made by Messrs. H. S. King & Company, the official Agents for the Indian and Colonial Exhibition, that they should be allowed to open in the Exhibition a separate "cigar and tobacco room," in which can be exhibited samples of raw and manufactured tobacco from all parts of India. Messrs. H. S. King & Company offer to place one or more attendants in charge of this room, who will furnish sample cigars, price lists of the different makers, weights of the cigars for computation of duty, &c. They will also take charge of consignments from the makers, and will take orders, either in large or small quantities. They undertake to represent all the manufacturers impartially, and without preference, and to make the increased popularity and greater demand for Indian cigars their special object.

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This proposal has commended itself to the Royal Commissioners, and has been referred by them for the consideration of the Government of India, by whom it has been formally approved. Small samples of Indian cigars and tobacco, both raw and manufactured, will be exhibited in the Imperial Courts of the Exhibition; but the space there assigned to them is necessarily limited, while it is impossible for the Government to give any facilities for trying them, such as will be offered in the proposed tobacco room. Under these circumstances, it has been decided that the Government exhibit of tobacco should be kept within limits sufficient to represent this important product in its principal branches. It is therefore strongly recommended, in the interests of the Indian tobacco trade, that consignments of cigars and tobacco, if sent in large quantities, should be made to Messrs. H. S. King & Co., or their Indian Agents, Messrs. King, Hamilton and Co. of Calcutta; King, King & Co. of Bombay, and Arbuthnot and Co., Madras. Much stress is laid on the desirability of consignments of tobacco and cigars being sent, if possible, some months before the Exhibition opens. Indian cigars, it is observed, nearly always arrive from India so wet as to be unfit for early use; and if passed through the Custom House at once before they have had time to dry, the duty payable is greatly enhanced by the superfluous damp which they contain.

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We see that Mr. Bosworth Smith, the newly appointed Mineralogist to the Government of Madras, has been making explorations in parts of the Nilgherries round Ootacamund and other places. It cannot be said that his enquiries have resulted in any important discoveries, but he seems to have done some good work during the short time he has been out. He has found small specimens of iron, traces of copper pyrites, and galena in quantity near Ootacamund, as well as of gold—the last named metal in such small quantities as to almost preclude the hope of getting at it with any prospect of gain. He also found a deposit of kaolin, which he thinks may possibly be used for the manufacture of porcelain. It would, however, require much cleaning and careful preparation before it could be thus utilized, as it was seen to be discoloured by iron oxide, and contains much silica grit. But Mr. Smith proposes to carry out certain experiments with a view to determine the economic value of the deposit. Mr. Smith seems to have exploded some of the statements contained in the District Manual, so far as it relates to the Nilgherries. One statement, that large masses of iron existed in the district has so far been found chimerical, that there was not a sufficient quantity to pay for smelting operations, except in small native furnaces. Another statement, that copper pyrites did not exist in the Nilgherries, has been proved to be fallacious, as many traces, and some specimens, were found. We hope Mr. Smith will dissipate many other fallacious statements in the District Manual aforesaid.

Fibre-yielding plants will always be in demand; if they are not suitable for the manufacture of fabrics, they can always be utilized in the manufacture of paper; and although varieties of known fibre-plants are many, yet every addition to their number is viewed with interest and satisfaction by the trade. Recently in the Madras Presidency, they have been experimenting with the fibre of a plant called *Helicteres Isora* (vernacular, *Kol-nar.*) The unsatisfactory result obtained was due more to an ignorance of the method of preparing fibre for the manufacturer's loom than anything else. It appears that 500lbs. of this fibre was supplied in April last by the Forest Officer of Ganjam to the firm of Messrs. Arbuthnot and Co. This firm has reported that the fibre was not properly prepared, being hard and quite black, and unsuited for manufacture into bags. It was found that the fibre had not been put through the usual steeping process, when stripped from the plants, but appeared to have been merely sun-dried. There were several varieties found in the consignment of 500lbs., old and young fibre having been mixed together, and the plants from which it was taken were found to have been cut at different times. Under these conditions, it was scarcely possible to obtain satisfactory results. There was, however, one quality which was found to be superior to Berhampore jute, and it was thought that if the plant was cut at the proper time, and put through the usual process of steeping, it would yield good fibre for making bags.

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The collection and transport charges amounted to Rs. 104-13-7 for 500lbs., which means Rs. 409-11-7 per ton. This rate is so high as to render the cost of collecting at Ganjam prohibitive. This is the second trial of the kind made with this fibre. The first trial was made some time in 1884, and the fibre was collected in the Kurnool district. The cost of collection and transport by rail on that occasion amounted to Rs. 53-12-0 for 1,500lbs., or at the rate of Rs. 80-4-3 per ton. Although this result is somewhere near the mark, it was at the time considered unfavourable. The lowest quality of jute can be had at Rs. 2-15 per maund, or, in round numbers, Rs. 82 per ton. The *Helicteres* fibre at Rs. 80-4-3 per ton is not so very bad; but as its quality is inferior to jute, it would not prove remunerative to produce it at that rate for the market. There is, however, this to be said, that the trial was made under unfavourable circumstances; and until such time as a thoroughly satisfactory experiment is made, it would be permature to pronounce a judgment on the quality of the fibre. We find that it is intended to send a sample of 100lbs. of the fibre to the Secretary of State for India for valuation in the English market. This reference should settle the question.

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A Local contemporary, referring to some of the principal revenue appointments which are to be abolished in the Madras Presidency, says:—"Last year the Abkari Department in the mofussil was amalgamated with the Salt Department, and placed under the charge of Mr. Bliss, the Salt Commissioner. It has now been decided that the Abkari Department in the town of Madras, hitherto under the charge of the Collector. shall be placed under the charge of the same gentleman. The Customs Department will also, probably, be placed under his charge, so that Mr. Bliss, like Aaron's rod, appears to have the capacity for swallowing up many others." There is, however, more beneath this satire than appears on the face of it. It is the bane of the service to saddle an officer with so many duties in addition to his own, that in his efforts to perform them all he is forced to lose sight of his legitimate duties, with the result that, instead of *one* department being *efficiently* managed, half-a-dozen are *mismanaged.* Whatever other attributes a civilian may be said to possess, it is certain he has not that of ubiquity. If he could, in addition to being ubiquitous, combine the attributes of Argus and Briarius, there might be a remote probability of a civilian managing half-a-dozen appointments at one and the same time.

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We learn from a contemporary that the cattle fairs at Hissar and Jahazgar, held during the spring of this year, were both a success, not only as far as a large increase in the number of cattle sent for sale at each fair, but also as to the prices realised. This latter is said to have been caused by a very large demand for them by traders coming from beyond the Jumna, and in one instance, Rs. 175 was offered for a single bullock and refused by his owner. With regard to these and other fairs, the Lieutenant-Governor has decided that, as the transfer of the management of cattle fairs to local bodies will soon be made, it will not be necessary, in future, to submit reports on them to the Local Government, unless there are any special points which call for orders. The fairs are now considered to be on a permanent and well-established basis, and generally nothing occurs from year to year which is likely to give rise to any new questions in connexion with them. In future, the fairs will only be noticed in the annual revenue administration report, and the only reference which need be made to Government will be in connection with applications for rewards, which at present require Government sanction.

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It will interest our readers to know, on the authority of *Kuhlow's*, that the origin of weights and measures in England was derived from a grain of wheat; *vide* Statutes of 51, Henry III., 31 Edward I., and 12 Henry VII., which enacted that 32 of them, well dried, and gathered from the middle of the ear, were to make 1 pennyweight; 20 pennyweights, 1 ounce; 20 ounces, 1 pound. It was subsequently thought better to divide the pennyweights into 24 parts, called grains. William the Conqueror introduced into England what was called Troy Weight, from Troyes, a town in the province of Champagne, in France, now in the Department of Aude, where a celebrated fair was held. The English were dissatisfied with this weight, because the pound did not weigh so much as the pound in use at that time in England. Hence arose the term *Avoir du poids* which was a medium between the French and the ancient English weights. Avoirdupois weight was first made legal in the reign of Henry VII., and its particular use was to weigh provisions and coarse, heavy articles.

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We note that the third edition of Dr. E. Balfour's *Cyclopædia of India* has just been published in London. The first edition was published in 1858 in India, the second in 1873, also in India, and the years 1877-84 inclusive have been occupied in revising it for publication in England. Dr. Balfour, in his prefatory notice, says that the present edition contains 35,000 articles, and 16,000 index headings, relating to an area of 11,722,708 square miles, peopled by 704,401,171 souls. There is no doubt that the work is a most comprehensive one, and likely to prove most useful and interesting as a book of reference. It takes in a very wide field, for the author says:—"India in its ethnology, its flora and fauna, can only be fairly dealt with by embracing a wider area. This is the reason why the Cyclopædia and my work on the timber trees include all Eastern and Southern Asia." The work consists of 3 volumes, embracing 3,628 pages; and the price—£5-5, although not high for a publication of this nature, places it beyond the reach of the average reader. We hope, however, that the publisher will see his way to producing a cheaper edition, so that it may come within the means of the masses.

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The proposed Veterinary College Hospital at Bombay does not seem to find favour with the Municipal Corporation of that city; at any rate, that civic body is not willing to contribute more than Rs. 2,500, or less than one-eighth, towards the maintenance of the hospital. The Government of Bombay have addressed a letter to the Corporation, expressing Lord Reay's regret at the scanty sum allotted by the municipality towards this useful and beneficial institution. But his Excellency has taken the 'change' out of the municipality. With reference to a hope expressed by the Municipal Commissioner, that the Corporation may be allowed to "nominate ten scholarships," the Governor in Council expresses himself unable thus to allot the right of nomination to scholarships, which are to be granted only to picked men selected with regard to their personal qualities and future intentions, and which will be given as rewards to the candidates most successful in the examination. The scheme provides for 15 free studentships, and the Governor in Council will be prepared to place three of these at the disposal of the Corporation on certain conditions, and a larger proportion in consideration of any additional contribution. We cannot, however, understand the necessity for these negotiations just now, as the College is only in prospective, the Government having declared itself unable to fulfil its promises of support for the project.

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A HOME contemporary, commenting upon Agricultural affairs in America, says :—The agricultural situation in America becomes more gloomy every month. At the beginning of April the condition of the winter-sown wheat in the United States was represented by 77 in the returns of the Department of Agriculture. A month later it had fallen to 70, and at the beginning of June it has further declined to 62. This is the lowest figure which the department has ever had to publish for the prospects of winter wheat. The reports from the Farmers' Associations are even gloomer than the official statements. But making every allowance for the natural despondency over such untoward prospects, it is evident that the wheat crop of America will this autumn be one of the smallest and the least available for exportation of any recent year. 207,000,000 quarters is the presently estimated produce of the winter wheat, and 153,000,000 quarters of the spring wheat. This last looks much better than in some recent years, its present figure being 97. With such an estimate from the principal source of supply of our wheat trade, it is an indication of the extreme dulness of trade that there is not the slightest sign of an upward movement in the grain market. The collapse of the upward movement of prices at the time of the war scare has been so thorough and the influence of the immense shipments of grain within the last weeks so marked, that the movement is still distinctly downward, and the price is now quite three shillings below the average of the low figures current this time last year. But the visible supply in America is now quickly diminishing, and the chances are that with the harvest, there will come some more activity in the wheat trade with rather higher prices for the farmer, on this side of the Atlantic at least.

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WE are told by a correspondent of the *Englishman*, who professes to be intimately acquainted with the Burdwan district, that matters are steadily improving amongst the people. We are unfeignedly glad to hear it, and hope earnestly that it is true. The rainfall has terminated of course their sufferings from the want of water which were very great, and we shall be glad to hear the report of the writer confirmed. Our confidence in his statements is not implicit, for we find him bringing the most monstrous charges against our native contemporaries, for the honorable interest they have shown in the condition of the people. He tells us positively, "as a simple matter of fact, that relief has been ample to allay the partial want from which the people are suffering ; that there has been no neglect of the condition of the people ; on the contrary, a most careful and scrupulous watch has been maintained, and at the first indication that matters were growing worse, the Government was prepared to extend the measures of relief." These statements are not, we fear, borne out by the facts. We notice them at greater length elsewhere, and also the unworthy charge which the writer makes as to the motives which have influenced our native contemporaries in the attention they have given to the circumstances of the people.

THE usefulness of the *Sar Kanda*, or *Munj* plant, in the south-east of the Panjab is, according to the author of one of the recent settlement reports of that part of the country, hardly less than that of the bamboo and palm in other localities. The leaves, we are told, are used for thatching houses, the reeds being bound round the edges and across to strengthen the thatch. The reeds are also used for making furniture, such as chairs and stools, and for agricultural implements, such as trays and baskets, and the frame-work of receptacles for chopped straw. The plant, further, often affords the only pasturage available for cattle, and though the dry leaves are said not to be very fattening (a statement which may be readily credited) they suffice to maintain the cattle in conditio The green leaves naturally yield greater nourishment ; but th appear only when the plant is fired ; and as reeds are seldom pr duced after the plant has been so treated, the villagers rarel resort to this process, except in the case of inferior plants. Bu the principal value which munj possesses in the eyes of the cultivator lies in the inexhaustible stores of fibre which it produces ropes and string, without which no agricultural operations coul be carried on, and no comfort would be found in their homes. I the autumn, the view is closed in on every side by the high flowering stems of the plant, and then is the chance for the zemindar to lead you a rare dance in search of his fields. Of late years, t villagers have taken to selling the *sar kanda* of their lands and many cases a very considerable income is realised from disposing of this natural product.

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WE take the following from *Kohlow's* :—An inter investigation has been made by Mr. L. Marx to de what country produces barley richest in protein (nitr ous matter), he having for his purpose analysed more than 400 samples from the harvests of six years. The mean percentages of protein, as found by him, are given in th following : —

Russia	12·76
Baden	12·38
Sweden	12·97
Danubian Provinces	11·68
Brunswick	11·49
North Germany	11·21
Bavaria	10·76
Alsace	10·70
Hungary	10·62
France	10·55
Hesse	10·43
Wurtemberg	10·38
Denmark	9·91
England	9·63
Austria	9·61

Some of the Russian barley gave as high as 16 per cent protein ; the maximum of Baden was 15 per cent, th mi mum 10·60 per cent. Bohemia and England seldom excee 10 per cent. Of 68 samples of Bavarian barley examined, gave over 12 per cent, the remainder under 10 per cent. the French barleys, those of Auvergne gave the lowest yiel those of Champagne and Burgundy being up to the avera of Bavaria. The percentage of nitrogenous ingredients Hungarian barley varied more than in any other kind, the numbers ranging between 9 and 12. Thick-skinned grain is poorer in nitrogen than thin-skinned, though this is not invariably the case. The quantity of phosphates in barleys, though very variable, bears no relation to the percentage of nitrogenous ingredients. Marx considers that chemical analysis is the only means of judging grain if the brewer requires regular, fermentation and sound yeast.

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THE *Bengalee* notices the fact that one of the leading vernacular papers of the City, the *Bangobasi*, has been threatened with prosecution for certain complaints made by it concerning the relief operations that are being conducted in Burdwan by Mr. COXHEAD, the magistrate. We suggest to this officer, who has so honourably distinguished himself from the first, by the concern he has shown for the distress of the people, *that it is not wise to weigh every word that is spoken by the* Press in times like those. The *Bangobasi* has taken the deepest interest in the state of the people, while the extraordinary apathy of the Government has shocked the Native mind very deeply. The *Bengalee* publishes a letter from the local Government, dated 11th instant, in which the Indian Association are told, in reply to their representations of the condition of the people in the neighbourhood of Nulhatti, "That "the advisability of granting advances for agricultural purposes "had already been realised by the local officers, and that esti-"mates of the amount required in the distressed tracts are "expected to reach Government shortly ; and that in the mean-"time, the Commissioner and Collector have been asked for "full particulars, as to the increase of numbers resorting to the "relief centres and the probable causes of the increase."

The Government seems never to realize properly, that famine one of those calamities, the relief of which must be prompt, o be of any avail. Enquiry ought *not* to be necessary at this tage of matters. The circumstances of the people have been ong known to the district officers, and our contemporary points ut justly, that while inquiries are being made at this hour, the season for cultivation is slipping by; and if the opportu- y is now lost—if there is to be no cultivation this year, as ere was none last year—the Government will incur a respon- bility, the magnitude of which it is difficult to exaggerate." The Government might at once order that the *tuccavi* grant, for he excavation of tanks—which will not now be wanted—should e employed for making advances to the people for "agricultural poses at once, and without waiting for estimates. Every is precious." We may conceal it from ourselves, if we it is unhappily too clear that famine is never met us in the right spirit. The Civilian mind is always haunted the fear of doing too much, and the almost uniform result is t nothing is done on a scale commensurate with the suffer- gs of the people. We have done all that it was in the power a single journalist to do, to awaken a more just sense of the laims of the people upon us at these periods, and have failed.

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The following is a summary of the weather for June 1885:— the west coast the weather of the first few days of the onth was marked by a few unimportant showers. On the h, however, there occurred a rather heavy fall of rain at lombo, and a moderate fall over the south and west of the ninsula, and from that day onward throughout the month, re was more or less daily rain in Ceylon and on the south- t coast of India. This rainfall has, however, been distin- hed by two noticeable characteristics. In the first place, fall has been accompanied by a very unsteady monsoon nt, while in the second place, and probably on account of variability in the wind direction, the extent of the fall has greatly restricted. This unsteadiness of the monsoon ent was particularly striking on the 8th and 9th, when a apparently skirted the west coast, travelling in a north- lirection, causing a marked disturbance of the average metric distribution, and drawing the wind over a large of western and south-western India into south-east, and in some places into east, a direction opposite to the nor- In Bombay itself, the burst of heavy rain which usually acterises the setting in of the summer monsoon, on the nkan Coast, has not occurred throughout the month, and the inds over that region appear to have been abnormally dry; nd further to the southward, *i. e.*, on the Malabar Coast, hough the winds appear to have brought up the normal amount f moisture, it seems to have been deposited only on the western face of the Ghats, and the stations in the Deccan and Hyderabad show a great deficiency of rainfall. The weather in the Berars, Khandeish, and Gujarat has been similar to that prevailing in the Konkan, the winds having been unusually dry; while in Sind and Cutch even the small average of those regions in this month has not been reached.

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As regards the Bay of Bengal branch of the monsoon, the reports show that until the 10th little rain of importance was recorded. From the 10th, however, rain fell generally over Burmah, Assam and Lower Bengal; but up to the 16th was restricted to those regions. On the 16th a small depression was forming over the Sunderbuns; and as this disturbance travelled first westward and subsequently north-westward, the rains extended up the Gangetic plain, and by the 24th had set in over the greater part of the North-Western Provinces. On the 26th a second depression was formed over the Sunderbuns, and this disturbance travelling westward in its turn, fairly established the rains over the North-Western Provinces and as far west as Delhi and the east of the Punjab. The heaviest falls of rain connected with these disturbances were :—

		Inches.			Inches.
Dacca, 18th	...	4·60	Benares, 25th	...	4·66
Nowgong (Assam), 19th		4·12	Naini Tal, 29th	...	5·80
Raipore, 20th	...	3·91	Aligurh, 29th	...	4·90
Jaunpore, 24th	...	6·60			

Though these depressions appear to have ushered in the rains from Lower Bengal to the Upper Provinces, it is important to note that, as was the case last year, the districts of Northern Bengal and Behar show a deficiency. It is remarkable that the disturbances noticed above, after giving plentiful rain to Lower Bengal and Assam, appear to have passed over Behar in a condition of diminished energy, but on reaching the North-Western Provinces, they seem to have again suddenly intensified and occasioned heavy precipitation. In the central parts of the country and the eastern half of the Peninsula, the returns show that Orissa and the Northern Circars have had less, and the Central Provinces and the Carnatic more, than the average amount of rain. With regard to the other meteorological elements, pressure on the whole has been above the average of the month, except in Bombay, the Berars, Hyderabad, the extreme south of the peninsula, and Orissa. In four of these five provinces precipitation has been deficient, so that the low barometer is probably to a great extent attributable to the high temperature prevailing in the absence of cloud and rain. The moisture in the atmosphere has been on the whole below the average, except in the Punjab, the Central Provinces, and Madras, the greatest and most general deficiency being reported from the Bombay Presidency.

SALT FOR CATTLE IN BURMAH.

We noticed briefly last week the enquiries instituted by the Chief Commissioner of British Burmah concerning the extent to which salt is usually given to cattle in that Province. We print this week the entire correspondence that has passed on the subject, omitting only the detailed replies of cultivators in the seven districts where enquiries were made. It appears that salt *is* given to cattle, and that they not only need it as a salutary diet, but take to it with avidity, thereby proving that it is an essential necessity in the internal economy of cattle. It is a practice that should, we think, be encouraged largely in all districts. From the correspondence before us, it is abundantly clear that salt forms an important element in the diet of oxen, and from the fact that it is administered when the animals are *tired* and worn out, after a hard day's work, shows the necessity there exists of impressing upon cultivators the wisdom of employing salt more largely than appears to be the case.

In the letter to the Government of India from the Officiating Secretary to the Chief Commissioner of British Burmah, it is stated that "The apparent discrepancy between the account given by the Deputy Commissioner of Tharrawaddy and that given by the Settlement Officer of the same district is, perhaps, due to Mr. Hildebrand's having consulted *cart-owners* about Tharrawaddy, while Mr. Adamson took the opinion of cultivators, who employ their oxen mainly on field-work." This appears to be erroneous; as, on turning to Mr. Hildebrand's report, we find the following passage in the opening paragraph of his letter :—"I have made personal enquiry from *cultivators* during my tours this season, and I have also received replies to enquiries made by township officers." [The Italics are ours.] The result of Mr. Hildebrand's enquiries to the questions asked, prove conclusively that salt is essentially necessary to the well-being of cattle, and we direct particular attention to the replies he received to the eight questions asked. In fact, the consensus of opinion is in favour of salt.

Mr. St. Barbe's report is interesting, and deals more in detail with the question at issue, than most of the other reports; but it seems to us scarcely necessary to use Burmese words written in the Burmese character, in an official report; as, to the general readers, in India particularly, the Burmese language is utterly unknown, and an otherwise interesting report becomes somewhat unintelligible. The Deputy Commissioner of Shewegyin (Mr. G. L. Weidemann) has also indulged in this practice.

Mr. Cabaniss, the Assistant Director of Agriculture, British Burmah, makes a somewhat sweeping assertion, which is not quite reconcilable with the general tenor of the various reports on the subject. He says that his enquiries of the cultivators have met *with the result that not one gave salt to their cattle,* except in cases of sickness. Further on, he says: "I have noticed the cattle fighting among themselves to get to a salt-lick," and mentions three places where salt-licks exist. He adds that "salt is given in America regularly, except in the neighbourhood of *good* 'licks,' which are rare in the Eastern States. It is generally given once a week, and about two tablespoonsful per head are given." With such testimony before them, our district officers should make it their business to encourage cultivators to give salt to their cattle. The question is one which ought to be taken up vigourously by the several Departments of Agriculture in India. Many of the diseases to which cattle are subject might be traced to the want of salt in their food.

It has been demonstrated, moreover, that the question of duty on salt has nothing whatever to do with the matter; and that were salt cheaper than it is, more would not be given to cattle. In Burmah, the duty on this commodity is very light; indeed, it may be said to be almost inappreciable. But this is not quite the case in India, where it has always been a vexed question. The monopoly of salt duties is entirely in the hands of Government, and it behoves the Government to make the duty on this necessary of life so light as to bring it within the reach of the humblest cultivator. The subject of salt duties is a very wide one, involving many intricate questions of policy and finance, which do not come within the scope of this paper. Our object in noticing it here has been merely to point out that in instituting these enquiries, the Government of India will bear in mind, that it is hopeless to expect cultivators to use salt largely for their cattle, so long as the duties on it put it beyond their reach.

THE DISTRESS IN BEERBHOOM.

The following letter from the Beerbhoom district was sent to the *Statesman* a few days ago. We make no comment upon it, but ask the public what they think of the facts it discloses? We have no reason to suppose that the writer, who sends his name, wishes to mislead us, or to create a scandal against the Government, and yet here is what he says:

> The much dreaded "weeding out" operation has commenced, at least at Shahapore. The officer in charge of the relief operations has, I understand, received orders to reduce the number of recipients as much as possible. This officer is, by the way, a probationary Deputy Collector on the threshold of his service, and not sufficiently hardened, I suppose, to loyally carry out his orders. It is said that while his young heart was rebelling against his work, a veteran of fifty-two battles appeared at his elbow, and at once removed all his scruples. So the cutting-down relief process is now in full swing.
>
> Under the present arrangements, only the absolutely crippled wil receive the gratuitous relief of twelve annas a month; the others being required to do more work than a robust man can do. It is worse than a denial of relief altogether. For every ten seers of *ghooting* (limestone) collected and carried to the relief centre, the pay is one pice or three pies. Now remember that the relief centre at Shahapore serves for 30 miles of distressed area. Imagine a half-starved woman, with one or two children to feed, and herself reduced to a skeleton, having to collect 10 seers of *ghooting*, and to carry them at sun-down a distance of say three or four miles to the relief centre to get in return one pice as food for herself, and her children! If this is not deliberate starvation of the poor, I do not know what is. Is there no power in the country to arrest and punish such cruelty?
>
> Unless the men who are committed to the No-Famine theory, and who have misinterpreted every fact in connection with the people, are removed from the place altogether, there is no hope for the poor famine-stricken creatures.
>
> The season for sowing and transplanting is nearly over, but the paddy fields are as bare as the floor of Belvedere. Cholera, I am glad to say, has all but disappeared from the town, so there is no danger in his Honor's paying his intended visit to this place.
>
> I am glad to inform you that the *Bangabashi* has sent money to open a relief depôt at a place called Batkar near Shahapore. This will be some set-off to the cruel neglect of our Government officials.

DISTRESS IN LOWER BENGAL.

A writer in the *Englishman* of the 22nd ultimo, professes to believe that the accounts which have been appearing in almost every Calcutta newspaper as to the sufferings of the people in the lower districts of these provinces, owing to the failure of last year's crop, and the appeals which have been made to the local Government to take adequate measures for their relief, have their origin simply in the disappointment of certain persons who hoped to make their relief an occasion for robbing the public treasury. The charge is prefaced as follows:

> There has been a good deal of cheap sympathy wasted over the so-called famine. In spite of all the shrieking of the native press, it is hardly necessary to say that, far from there being a famine, there has not even been a severe scarcity.

The columns of the very paper that prints this story, have contained urgent appeals from the district magistracy for the assistance of private charity to the people, and Mr. Coxhead is to this hour administering funds subscribed in answer to his appeals for help. The writer proceeds to charge the native papers—which have so honorably distinguished themselves by their efforts to inform the public mind of the true state of matters amongst the people—as follows:

> The real grievance of the native papers, however, is that there has been none of that lavish disbursement of Government money which gives the word 'famine' a golden sound in the ears of a large and miscellaneous class. There has been no opening for the jackals. Indeed, to many, after having had the means of suddenly enriching themselves almost brought within reach, the thought that there is to be no famine after all is positively maddening. It is a pitiable sight to see these creatures prowling around, and hungering to turn the distress of the district into a harvest of ill-gotten wealth.

With the history of our famine relief operations in the last 25 years fully before our mind, it is difficult to characterise such charges too strongly. Where and when have these practices prevailed? We have a minute memory of every famine that has occurred in India in the last 25 years, and the only circumstance we can recal throughout the period, that gives the faintest justification to such a charge, is the extravagance which marked every measure of Sir Richard Temple's relief measures in 1873-74, when the Behar planters reaped a harvest of rich gains from the transport of grain, so wildly urged by him at all costs. We can recal no other period of famine in our time, in which the relief measures of the Government were not an absolute mockery of the people's sufferings. In 1860-61 the Government professed to brace itself up for a great effort to relieve the people in the North-West Provinces whose sufferings in that year were so terrible. The late Colonel Baird Smith's report on the famine, remains the monument of our failure to this hour: a million of people having died of hunger in that calamity. The famine in Orissa, five or six years later, was so effectually met, that the civilized world was struck with horror at the narrative of a third of the population being swept away. The famine in Rajpootana followed within a year or two, when the same disgraceful and utter failure was witnessed, and another million or more of the people died. A famine simultaneously occurred in the Behar districts, and again the people perished by myriads. Four years later came the scarcity in Behar and Bengal, when for the first time in modern history, the Government met it in the right spirit; and had Lord Northbrook not unfortunately conceived a strong jealousy of Sir George Campbell—who was as fully alive as himself to the action that was necessary—Sir George would have carried the people through the scarcity without the loss of a life, and at an expenditure of one-fifth of Sir Richard Temple's extravagant outlay. We owe the reaction that has since set in, to the measures taken by this gentleman in concert with Lord Northbrook and Major Baring. The very same man, when the terrible famine of 1877 began to disclose itself in Western and Southern India, now went to the most cruel extreme in the opposite direction, and the result of his interference as delegate from the Supreme Government, was finally seen in the dreadful record that four to five millions of the people had died of hunger in Western India and Madras, and a fourth of the entire population of Mysore. Early in the next year, 1878, came the famine in the North-West Provinces, in which Sir George Couper and Sir John Strachey privately arranged that 'nothing' should be done, but even the land revenue exacted as in ordinary years. Many in Calcutta must remember the vehemence with which the *Englishman* and the *Pioneer* denounced the *Statesman* at that time, for insisting that the people were perishing. Then, as now, the Government was declared positively to be doing everything that the circumstances of the people required, to be met at last by a disclosure that ought to have led to the dismissal of both those great officials from the service of the Crown for all time. They had not only done nothing, but had issued private orders that nothing was to be done. We estimated that 600,000 of the population died of hunger in that famine, and our columns teemed with the most harrowing description of the sufferings of the people. Sir JAMES CAIRD publicly raised our estimate of 600,000 to 1,250,000 in a letter to the *Times* in 1880. And with these dreadful facts in our remembrance, this writer in the *Englishman* dares tell the public that the cause of the present outcry is that the native papers are in league with a gang of plunderers, who are disappointed that the treasury doors have not been flung open, *as they usually are at these periods.* We have never once known those doors opened as they should be, but in the Behar mania, *when we opposed Lord Northbrook's* extravagance. The native papers of Calcutta deserve nothing but the highest praise for their exertions in the present sufferings of the people. The action of the Government has been shamefully inadequate to their needs. When this writer says "that some of the statements regarding the actual amount of relief given in certain cases, are monstrously false, and are merely intended to facilitate the manufacture of a famine," we ask what statement could be worse than that of the Collector of Burdwan himself the other day, that he was giving the destitute adult 2 pice a day, and the child but 1 pice, and that to save the pinch of *dal* and the cost of the firewood in the cooking, he was giving the rice *raw*. It was not the native papers that made the statement, but the relief officer himself: and as we saw, it was approved by the Lieutenant-Governor, without a thought of what it meant. If we err at all at these times, we should err on the side of liberality, whereas the uniform story is of measures scandalously inadequate to the circumstances of the people, with the uniform result of their dying in such numbers that every effort is made to conceal them from the public. Sir RIVERS THOMPSON has revived traditions of the service, in dealing with this calamity, that we hoped had finally disappeared from amongst us.

Miscellaneous Items.

THE Goa treasury, it is expected, is to receive Rs. 1,90,000, in the shape of salt-pans' indemnity, from the British Government. Of this sum, Rs. 1,50,000 are to be paid to landholders on the Marmagoa Railway Line, and Rs. 40,000 to the owners of salt-pans.

ON the 16th July twelve shocks of earthquake were felt at Srinugger, one being very violent. The floods have subsided lately, and the damage done is confined to a small part of one of the four districts of Cashmere. In the rest of the valley the prospects of the crops continue good.

A CORRESPONDENT from Simla says that a rumour is current there, to the effect that his Excellency the Viceroy and Governor-General of India has asked for detailed translations of the views expressed by the Native Press in the Bengal Presidency, on the present distress in some parts of Bengal.

THE gold medals, distributed by the Governor of Pondicherry to the persons who had particularly distinguished themselves during the inundations of November and December 1884, are handsome and massive, containing about Rs. 50 value of gold in each. The name of the owner and date is engraved on the medal, with the words, "Awarded for courage and devotion."

THE High Court lately addressed Government, drawing attention to the desirability of passing early a legislative enactment to exclude suits for arrears of rent of land from the jurisdiction of village Moonsifs. Government have coincided with the High Court in the desirability of such a measure being carried out, and the matter is now receiving attention in the Legislative Department.

H. H. THE NIZAM is anxious to keep up horse-breeding in his territory, and has selected Aurungabad for the purpose. His stud at that place consists of seven stallions and mares. Another batch of eighteen are to follow, making a total of twenty-five. Captain Abdulla is to be in charge, and will visit Aurungabad occasionally. The farm is being built outside the city, where fodder and water are plentiful.

THE Press Commissioner has issued the following:—For the benefit of goods manufactured in Persia, H. M. the Shah in 1882 issued a decree, interdicting the importation into and the sale of aniline dyes within his territories. Information has now been received by the Government of India, that H. M. has recently placed a similar restriction on the importation into Persia of thread colored with such dyes.

AT the end of the last official year, there were seventy-two Jute ware-houses in the town of Calcutta. The license fees realized during the year under notice from them amounted to Rs. 23,275, or Rs. 141-10 3 more than last year. There were two cases of fire—one at No. 1, Ahireetolah-street, and the other at No. 43, Nimtollah Ghat-street. The loss sustained by the owner in the former case amounted to Rs. 1,000, and in the latter to about Rs. 14,000.

WE are much gratified to hear that the shipping [illegible] between Singapore and Bangkok has increased greatly of late, and that to keep pace with this increase, Messrs. W. Mansfield & Co., Agents of the Ocean Steam Ship Company, are shortly expecting a new steamer called the *Hecate*, to establish a weekly service, in connection with the *Hecuba*, which has hitherto performed the run fortnightly. The *Hecate* is in all respects a sister ship to her future consort.

WE have been favoured with a copy of Vol. II, Part IV, of *Meteorological Memoirs*. They are interesting in various ways, one object in view being to indicate that there are probably definite relations between the number, character, and paths of the south-west monsoon storms of the Bay of Bengal, and the larger abnormal meteorological conditions of the year. The subject of storms should be more closely studied by the general public than it is. These memoirs contain much useful information on this subject.

THE total number of deaths registered in the Suburbs of Calcutta, during the week ending 4th July, was 149, against 136 and 146 in the two preceding weeks. Under the head of cholera, there were 22 deaths, against 33 and 17 in the two preceding weeks. During the week under notice there were 3 deaths from small-pox, 43 from fever, 19 from bowel complaints, 2 from injuries, and 60 from other causes. The general mortality was at the rate of 30·8 per 1000 per annum, against 28·1 and 30·2 in the two preceding weeks; while it was 23·3 in Calcutta during the same period.

THE Government Director of Bangalore Woollen Mills, Mr. Ricketts, has issued instructions to the Secretary to take out proceedings at once against defaulting shareholders. There are in all something like twenty shareholders in the concern, who own from one to twenty shares, who have not paid up, and the capital represented in the aggregate by these holdings amounts to about Rs. 12,000. This is certainly a very large outstanding, and the money if collected may help to give a great impetus to the enterprise which it very much stands in need of just now.

ON Tuesday last week the Irrawaddy Flotilla steamer *Irrawaddy* arrived from Mandalay, and amongst her cargo were 105 bags of what purported to be tamarinds, consigned to a local Chinese firm. In examining these bags, Mr. Latimour, Customs Preventive Officer, had his suspicions roused as some hard substance within resisted the probe. He thereupon opened one of the bags, and found in the midst of some fruit a quantity of lead. The bags were strictly watched, and when a Chinaman came to take delivery he was taken into custody, and admitted that some fifty bags contained lead, and that this subterfuge was resorted to to evade the duty leviable at Mandalay by the Upper Burmah authorities.

THE total number of deaths registered at Howrah during the week ending 4th July was 44, against 46 and 40 in the two preceding weeks. Under the head of cholera there were 2 deaths, against 6 and 2 in the two preceding weeks. There were 23 deaths from fever, 5 from bowel complaints, and 14 from other causes. There were no deaths from small-pox and injuries. The general mortality during the week under notice was at the rate of 21·7 for 1000 per annum, against 22·6 and 19·7 in the two preceding weeks, while it was 30·8 in the Suburbs and 23·3 in Calcutta during the same period. Howrah would therefore seem to have been healthier than Calcutta, not to say the Suburbs, during the week under notice.

THE total number of deaths registered in Calcutta during the week was 209, against 201 and 195 in the two preceding weeks, and 52 in excess of the corresponding week last year. There were 29 deaths from cholera, against 22 and 16 in the 2 preceding weeks, the quinquennial mean being 9. The disease for the past 3 weeks has shown a tendency to increase, and it will probably continue to do so to a slight extent until the rainfall becomes heavier. There was only one death from small-pox during the week, and none in the previous week, so that the prospects with regard to this disease continue to be favourable. Fever and bowel complaints were slightly in excess of the average during the week. The general mortality was at the rate of 25·1 per 1000 per annum.

IT will no doubt be a matter of rejoicing for the Anti-Opium Society, to learn from the report on the foreign trade of China, for the year 1884, that the nett quantity of foreign opium, taking all kinds together, which has been imported through the foreign Customs' Department, has varied but little during the last three years, and at any rate has not shown an increase. There was a slight rise in the quantity of Malwa opium imported, but the import of Patna opium has fallen off from 16,500 piculs to 13,600. Benares opium has also been in less demand, as the quantity imported has fallen from 18,000 piculs (one of the largest importations ever known) to 12,400 piculs; whilst Persian and Turkey opium have fallen from 6,000 piculs, in 1881, to 4,400 piculs in the year 1884.

THE Poona Sarvajanik Sabha presented an address of welcome to Lord Reay at the Council Hall, Poona. Among the questions to which the members invite his Excellency's attention is that of forest conservancy. The Sabha remark that this affects not only Thana, but more or less all parts of the presidency. The people fully appreciate the natural anxiety of Government to spare no effort to restore the old state of things. But they feel that the details of forest administration require to be very carefully watched, lest the interests of the present generation may be unduly sacrificed to those of posterity, as they fear they are at present. Perhaps the idea of making this department a source of revenue lies also at the root of many of the existing abuses, and consequently the vested interests of many helpless classes are possibly endangered by a too stringent method of working. The best way in which the public and private interests might be reconciled would be by the appointment of a Commission of European and native experts as had been resolved upon.

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

The Ordinary General Meeting was held on Wednesday, the 24th June 1885.

PRESENT:

D. CRUICKSHANK, Esq., Vice-President, in the Chair.

Mr. John Martin.	Baboo Protapa Chundra Ghose.
„ P. Playfair.	Mr. W. H. Miles.
Dr. S. Lynch.	„ R. Blechynden, Jr., Deputy Secretary.

COMMUNICATIONS.

From Mr. D. Allen, C.S., Bankipore, enquiring if Eucalypti are likely to grow well in the Barrh sub-division of Patna District, and requesting to be put in the way of procuring some seed, as well as instructions for the best mode of cultivating them. Small quantities of the seed of three varieties—Eucalyptus rostrata, E. resinifera, and E. globulus—were sent to Mr. Allen, with instructions for sowing.

From Mr. James E. Bridges, C.S., Officiating Secretary to the Chief Commissioner, British Burmah, in reply to an enquiry, stating that the Chief Commissioner has no objection to the reproduction in the Society's Journal of Mr. Wood-Mason's Report on an insect which attacks the paddy crops, if that gentleman consents to it. He adds that he regrets that no accurate information can be given regarding the extent of the damage done by this insect. As Mr. Wood-Mason's consent was obtained before the Chief Commissioner was addressed on the subject, his interesting paper will appear in the next number of the *Journal*.

From Captain A. Barrow, Kooloo, Kangra, who writes:—"I send you by parcel post a few specimens of a large fern called in Kooloo 'Lengri;' when eaten young it is a most delicious vegetable. Can you very kindly tell me its name, and whether it grows in England? I hunted for it last year in Hampshire, but could not find it. How could it be introduced into England?

"All the peaches in Kooloo have been attacked by some disease, which kills the trees. I send you some specimens along with the fern. Can you tell me what the disease is, and how it can be cured?"

The parcel arrived in a very damaged condition; indeed, with the contents quite unrecognisable; fortunately, the native name given for the fern is sufficient for its identification as the Pteris Aquilina, the bracken, common to so many parts of the world, including England.

Captain Barrow also mentions that all last year's potatoes have become diseased, both in Kooloo and in Kangra Valley, and none are procurable. It is to be hoped that care will be taken to reject any suspected seed when the planting season arrives, for it may give the cultivators much trouble.

ENGLISH POTATOE SEED.

Another report has been received on this seed, which was presented to the Society last year by Mr. W. Stalkartt. From the quantity sent to him, Mr. F. W. Blechynden, of Chumparun, sent the greater part to Mr. Girdlestone for trial in the very favourable climate of Nepal. The result is very disappointing and compares very unfavourably with those recorded by Mr. Anderson, C.S., of Bancoora, or by Mr. Blechynden, in the *Proceedings* for March last. Two of the three varieties yielded Mr. Anderson six-fold and five-fold respectively, the third was a failure. Mr. Blechynden got 5½, 6½, and fourfold from the three varieties he planted. The following is Mr. Girdlestone's report:—

'Ashleaf ...	Planted 12 lbs.	Outturn 52 lbs.
Victoria ...	„ 14 „	„ 30 „
Late Rose	12	„ 50 „

"The potatoes were sown in an ordinary field, on ridges well separated by furrows, in a light soil moderately manured with compost of leaf mould and stable refuse; they were kept well weeded, and had constant waterings during the late dry spring. They were not attacked by insects. I cooked some of each kind, but did not find them better than varieties already in the valley."

APHIDÆ ON TEA LEAVES.

From Messrs. George Henderson & Co., forwarding an extract of a letter from Mr. Troup, of the Mullakattyoor Tea Estate, Kumaon, with specimen of the affected leaves alluded to, asking for a report. As other planters may have been troubled with similar experience, Mr. Troup's description, with the report kindly furnished by Mr. Wood-Mason, are both given in full:—

Extract from a letter, dated the 7th June 1885, from NORMAN F. T. TROUP, Esq., *of the Mullakattyoor Tea Estate, Lackington, Baijnath, Kumaon.*

"By this day's post I am sending you a few sprigs of a Tea bush that presents a most curious appearance, and should feel very much obliged if you would kindly get some of your friends learned in such matters to explain what is amiss with them.

"The leaves of the bushes that are thus affected present a varnished appearance, and are coated with some sticky substance like honey which is also as sweet as honey, and the young shoots are covered with a small winged *brown* fly like the *green* fly that attacks some kinds of flowers in green-houses. There are also some small six-legged insects like bugs on these bushes, of a slatish black colour dotted with white. I at first thought that these insects were accountable for both the brown fly and sticky substance on the leaves, but so far as observation has enabled me to ascertain, they only prey on these flies. I observed the same sticky substance on the bushes during the winter, but then concluded it to be an abnormal supply of honey in the flowers, as at that time it was dropping out of them, but now there are no flowers for it to come from.

"This fly, other insects, and the stickiness do not seem to affect the health of the bushes, as those they are on look as vigorous, and are flushing as freely as those free from them.

"Up to date we, in this district, have been entirely free from all tea pests, and hence my curiosity and ignorance regarding this one, if it is a 'pest.'"

Mr. Wood-Mason's report:—"The sweet and sticky substance on these leaves is no doubt 'honey-dew,' mixed with exuded sap. Many leaf-lice (*Aphidæ*) are provided on the dorsal surface of the ante-penultimate abdominal segment, with a pair of tubular prominences, the so-called 'honey-tubes,' each of which bears at its extremity a minute pore. From these pores, there continually exudes a sweet fluid, secreted by special glands, and eagerly sought after by ants, the so-called 'honey-dew,' which is frequently deposited upon the leaves frequented by the lice, there becoming mixed with the sap that exudes from the punctures made by these insects with the four stilets of their sucking mouth in feeding. Hundreds of the lice [the 'brown bugs' of your correspondent are *females* and young, and the '*brown flies*' are *males*] are glued to the different parts of the tea plant, as also are numbers of the fluffy white cast skins of larvæ which are popularly termed 'mildew,' though they have nothing whatever to do therewith. The matter is of no practical importance whatever."

FUMIGATION FOR INSECT PESTS.

Mr. Claude J. Dumaine lately suggested that fumigating with Mohwa oil-cake, if done immediately on the first appearance of insect pests, while still affecting small areas, might be usefully tried by tea planters and others. He was asked to communicate his own experience, and writes as follows:—"*Koonri Oil cake* is made from the seed of the Mohwa (*Bassia latifolia*) from which the oil has been expressed. I was given to understand that the smoke from it, when burned in a house, was sure death to all kinds of insects. This gave me the idea of trying it in the open air. Some of my paddy, rahar, and moong dall, having been attacked by blights, I gave it a fair trial, which proved a success. I got a number of ordinary *handies*, and filled them three-quarters full with dry cow-dung cake, and after firing filled up with *koonri* oil-cake. The *handies* were then distributed on the windward side of the affected fields. The wind that day was nominal, and the smoke was very great, and I can certify that none of the blights outlived the operation. The plants were in no way affected. I fancy 20 seers might be enough for a square Bengal beegah.

"The cost of the oil cake is Rs. 4-8 a maund, delivered at Howrah Station, exclusive of bags, and it is only procurable at a certain time of the year. I shall be glad to procure some for any person wishing to give it a trial."

EARLY AMBER SORGHUM.

Mr. A. Whyte, junior, of Raneegunge, writes in reference to this Sorghum:—

"In the early part of last year I wrote informing you that I contemplated making an experimental silo as well as growing the early Sorghum up here, and promised to give you the results of my experiments, which I have now much pleasure in doing.

"I will be very much obliged if you would kindly aid me with any advice you may be in a position to give, in reference to the cultivation of the Sorghum, as I seem to have failed somewhat in my experiment with it.

"I should mention that although I received the Sorghum seed from you on the 25th of May 1884, I was unable to sow it until the 12th of July, owing to some difficulty in securing the lease of the land, and it was too late then to do much in the way of preparing the land by ploughing and manuring, as the rains having set in rendered the ground unfit to work; so that the failure I have above alluded to may be in some way accounted for by this fact.

"The plants when they grew up proved generally very thin, and some of the thicker ones were of a reddish spongy appearance inside. The canes were from ½" to 1" in diameter, and from 8 to 10 feet in height, and were cut on the 29th of October, as soon as the seed had ripened on them. You sent me 2 lbs. of this (Early Amber Sorghum) seed, and the juice extracted from the whole crop by the common native mills weighed three maunds, ten seers; but though I employed the men most skilled in converting the sugar-cane juice into jaggery, their efforts to do so with the juice of the Sorghum were a failure. I intend to try the experiment again this year, and have had the land well ploughed and manured for the purpose; and I think by sowing it a month earlier and planting the seed about two feet apart (I may here mention that last year it was sown broadcast,) it may be attended with better results. I shall, however, be glad to receive any directions from you as to the method of sowing, and converting the juice into jaggery, as I am anxious to make the experiment a success, as the natives here seem quite astonished that sugar-producing Sorghum can be grown from seed, and are therefore interested in the results.

"Notwithstanding my want of success I had applications from cultivators who were desirous of trying the Sorghum themselves, and wished to purchase seed from me.

"Although the syrup could not be converted into jaggery successfully, yet to test its value, I had what was made sold, and it found a ready-market though at a low price, for conversion into sweetmeats, &c."

Mr. Whyte has been informed that, according to the information at our disposal, the point requiring greatest attention in making Sugar from Sorghum, is the time at which the cane should be cut. The American Agricultural Department to whom the recognition of the capabilities of the plant is due, and who have made a vast number of experiments with it, have divided the growth of the plant into stages for convenience of reference in their reports; these stages are numbered and lettered as follows:—

Stage.	*Development of Plant.*
E.	About one week before opening of panicle.
F.	Immediately before opening of panicle.
1.	Panicle just appearing.
2.	Panicle two-thirds out.
3.	Panicle entirely out: no stem above upper leaf.
4.	Panicle beginning to bloom on top.
5.	Flowers all out. Stamens beginning to drop.
6.	Seed well set.
7.	Seed entering the milk state.
8.	Seed becoming doughy.
9.	Seed doughy, becoming dry.
10.	Seed almost dry, easily crushed.
11.	Seed dry, easily split.
12.	Seed split with difficulty.
13.	Seed split with more difficulty.
14.	Seed split with still more difficulty.
15.	Seed harder.
16.	Seed still harder.
17.	Seed still harder.
18.	Seed still harder.

"Determination of the stages, after No. 14, was more difficult than that of the preceding ones, and depended on the increasing hardness of the seed."—Agricultural Bureau's Report, Washington, for year 1882-83.

The reports further on show in a tabulated form, which need not be reproduced, that 'the percentage of juice extracted from the stripped stalks gradually increases up to the *eleventh stage*, then slowly decreases to the end of the season. The specific gravity of the justice the percentage of sucrose, the percentage of solids not sugar, and the exponent, regularly increase (with but one or two exceptions) until the close of the season; and the percentage of glucose in the juice as steadily decreases from the first.'

In another place it is stated that 'in their early stages of development, up to and including the sixth stage, the available sugar is given in a minus quantity, *i. e.*, the amount of sucrose in the juice is less than the sum of the glucose and the other solids;' this means in practice that there is no available sugar, and consequently it is argued that immature cane should not be mixed with ripe cane, as it is 'not only worthless in itself but causes the loss of sugar otherwise available;' a number of figures are brought forward to prove this statement, and it is mentioned that the sugar planters in Cuba and Louisiana recognise the fact, and cut off and leave in the field the immature tops of their *Sugarcane*, having learned from experience that sending them to the mill results in actual loss in sugar produced. In mature *Sorghum*, however, there is no practical difference between the quality of juice contained in the top, or in the butt of the plant; suckers should be discouraged and not be cut with the crop.

In the experiments conducted at the Government Farm, Cawnpore, during 1883, noted in this Society's *Journal*, Part II, Vol III, some 18 or 20 maunds of *goor* were made, without the addition of lime, yet the juice was manipulated with the same ease as that of the sugarcane. Still the report kindly given by Mr. Turner on the *sample* received from there, was unfavorable, namely, that it was valueless to the refiner.

It seems probable that the Indian practice of boiling the juice in pans directly over a blazing fire is fatal to the proper crystalization of the sugar.

SILOS.

Mr. Whyte, in the same communication above referred to, reports on his silo experiment:—

"My silo experiment, I am glad to say, proved rather more successful. It was a brick-built one of the following dimensions, 10×8×8 feet. It was loaded on the 14th of October 1884, and as the seed of the Reana Luxurians you so kindly sent me for the purpose yielded only enough to fill three feet high of my silo, and I was unfortunately away from the station at the time, it never occurred to the native whom I left in charge to fill it up with other grasses, since I omitted to mention to him that this may be done, believing the crop of Reana Luxurians would be ample; so it was closed, with only the above quantity. On the 15th of April this year upon the silo being reopened, the fodder was not only found to be in a perfect state of preservation, but the cattle to which it was given ate it so eagerly as to convince the natives to whom they belonged of their appreciation of it. At the opening of the silo were present besides Mr. T. Inglis, Sub-Divisional Officer of Raneegunge, and Mr. G. H. Walsh, Officiating Magistrate, several Native zemindars and ryots, who had been invited by Mr. Inglis to be present."

"This year I intend to make a silo by simply digging a pit in the ground, and loading this as well as the brick-built one of last year with country grasse, as there seemed to exist in the minds of the natives some doubts as to the country grasses standing the test, attributing the success above-mentioned to the grass being the produce of foreign seed."

In a subsequent communication, Mr. Whyte mentioned that he had, in conjunction with Mr. Inglis, the Sub-Divisional Officer, caused the day on which the silo was to be opened to be widely known, and great interest was shewn by natives of all classes in the neighbourhood, who assembled in crowds on the day appointed, and who thoroughly admitted the success which had been achieved in preserving the fodder. Some of them, however, attributed the success to the fact of the grass ensilaged being peculiarly suited to the process, and as many took intelligent interest in the proceedings, and obtained all particulars regarding ensilage from Mr. Whyte, a quantity of Reana Luxurians seed is placed at his disposal to distribute among those who will try it practically themselves. Parts of districts of Beerbhoom and Bancoora are perhaps more in want of a system of storing fodder than any other places in Bengal, for, from the middle of March till the rains set in, the grass in the laterite soil gets quite burnt and withered, and can barely sustain life in the cattle, who are thus reduced to skin and bone just at the time when the heavy work of ploughing the paddy land commences. The laterite soil is well adapted for pit silos, and Mr. Whyte may be the means of introducing an urgently needed system into these districts.

RICHARD BLECHYNDEN, JUNIOR,

Deputy Secretary.

SALT FOR CATTLE IN BURMA.

FROM J. E. BRIDGES, ESQ., C.S., Officiating Secretary to the Chief Commissioner, to the Secretary to the Government of India, Revenue and Agricultural Department, Simla, No. 1101-13C.,—Dated Rangoon, the 6th July 1885.

SIR,—I am directed to submit copies of the papers concerning the extent to which salt is usually given to cattle in Burma. It has on occasions been supposed that the Indian salt-duty prevents cultivators giving to their oxen a due allowance of salt. The salt-duty in Burma is one-tenth of the present duty in other provinces of the Indian Empire, and it seemed interesting to enquire whether Burmese owners usually give salt to their cattle.

2. The net result of the present reports is that Burmans do not give salt regularly or usually to their cattle. They often, however, give a little salt to buffaloes or oxen that are working particularly hard or plying in the sun. In tracts where cattle are fed on straw, salt is more frequently given. In the delta, and in places where the soil is impregnated with salt, cattle often resort to salt-licks. It would seem that salt is given more usually to cattle plying with carts than to plough-cattle employed in the fields. The apparent discrepancy between the account given by the Deputy Commissioner of Tharrawaddy, and that given by the Settlement Officer of the same district is, perhaps, due to Mr. Hildebrand's having consulted cart-owners, who employ their oxen mainly on field-work.

3. The papers may have some general interest, in so far as they throw light on the question whether Indian cultivators would give salt more freely to their cattle if the salt-duty were much lighter than it is in most Indian provinces.

From R. F. FROST, Esq., Veterinary Instructor, British Burma, to the Commissioner of the Pegu Division,—No. 3290, dated the 11th June, 1885.

IN compliance with the orders of the Chief Commissioner, Land Revenue and Agricultural Department, No 2299-19C, dated Rangoon, the 18th October 1884, I have the honor to forward replies on the question of the consumption of salt by cattle in British Burma from the following officers, namely,—the Deputy Commissioners of Tharrawaddy, Kyaukphyu, and Shwegyin, and the Settlement Officers, Pegu, Tharrawaddy, Henzada, and Akyab, together with a note on the subject by the Assistant Director of Agriculture.

2. I may here record the result of inquiries made by myself during the last seven months in the districts of Hanthawaddy, Pegu, Tharrawaddy, Prome, Thayetmyo, Henzada, Thongwa, Shwegyin, and Akyab.

3. I find that salt is very little used for cattle in most of these districts. In some it is given sparingly; in others not at all.

Very little, if any, is given to buffaloes. Its use seems to be confined to working oxen.

When cattle are worked in the sun, or when they are about to start on a long journey, some owners are in the habit of placing a little salt on the tongue and rubbing a little on the nose rope and muffle; but even this is by no means a general custom.

4. In exceptional cases, where cattle are hand-fed by careful owners, a little salt is sprinkled over a mixture of chopped straw and linseed cake.

5. Occasionally a small quantity of salt is sprinkled on a sieve and placed within reach of the cattle to lick, and the posts to which oxen are tied have salt applied to them so that the cattle may lick them. The owner's object in giving salt as described above is to make his cattle fond of their homes.

6. Salt is sometimes given in conjunction with other remedies for medical purpose, but not to any great extent.

7. I have taken particular care to ascertain whether the cost of salt has anything to do in regulating the quantity given to each animal, and in no single instance have I been told that if the article could be obtained at a cheaper rate, a larger quantity would be administered to animals.

The people do not attribute any special virtue to salt in so far as it affects the general healh of cattle. Indeed although cattle-owners are in the habit of putting a little salt on the tongue of working oxen, not two men out of every hundred of those consulted by me could explain the action of salt given in this way. The reply which I have invariably received when endeavouring to ascertain why owners gave salt when animals were exposed to the sun, was "that it was the custom to give it."

So far as I have been able to ascertain, Burman cattle-owners do not give salt largely or generally to their cattle.

8. With regard to the concluding paragraph of the Chief Commissioner's letter, in which I am desired to compare the facts brought to light by these inquiries with known facts as to salt used for cattle in Europe, I may state at once that if salt is used by Burmese cultivators as freely as is represented by the Deputy Commissioners of Tharrawaddy and Bassein, the cattle receive a much larger quantity of salt than is administered to cattle in England. I can write from practical experience of the conditions under which cattle are kept in the south of Ireland, and there it is by no means the custom to give salt to cattle. Indeed salt is seldom or never given. Neither is it the custom in England, except where high-class breeding is practised and animals are stall-fed.

9. There is no doubt that a more free use of salt for cattle would be highly beneficial, and that it would tend to a certain extent in rendering animals less susceptible to attacks of disease. But so far as this province is concerned, I do not think the price of the article influences the ordinary cattle owner as to the quantity of salt which he gives his cattle.

10. It may be foreign to the question under notice to add that the great need of the Burman cattle owners is not cheap salt, but an abundant water-supply during certain months of the year. But it is a question about which there cannot be a difference of opinion that in most parts of the province the quantity and quality of the drinking water for cattle during certain months of the year is decidedly bad, and I have no hesitation in attributing many outbreaks of disease to this cause alone. As this is not the place to enter into particulars on the question of water for cattle, I shall not add anything further on the matter.

From T. C. MITCHELL, Esq., Settlement Officer, Akyab, to the Veterinary Instructor, British Burma,—No. 56 42, dated the 24th April 1885.

IN accordance with instructions received from the Junior Secretary to the Chief Commissioner, British Burma, I have the honour to inform you that I cannot find that salt is used as food for cattle in any part of this district.

From Deputy Commissioner, Kyaukpyu, to the Veterinary Instructor, British Burma,—No. 2049 224, dated the 30th March 1885.

WITH reference to Land Revenue and Agricultural Department No. 2297-19C., regarding the use of salt for cattle, I have the honour to state that all the officers of this district concur in the opinion that salt is never given to cattle except in cases of illness. The dearness of the article is not the reason why it is not given. The cultivators do not know of, and in fact do not believe in, its utility as an ordinary article of food for cattle.

From Captain S. A. N. PARROTT, Settlement Officer, Pegu, to the Veterinary Instructor, British Burma,—No. 155 1, dated the 24th October 1884.

WITH reference to letter No. 2297-19C, dated the 18th October, 1884, from the Junior Secretary to the Chief Commissioner, directing a report to be submitted to you by April next on the subject of the use of salt for cattle by the people, I have the honour to report—

(i) that the letter has been received too late to enable me to make especial enquiries as our work closes in a few days;

(ii) salt is very rarely given by the Burmese to their cattle; the only occasion in which it is given is in sickness medicinally;

(iii) some natives at Htaukyan, in the settlement tract, assert they give about three viss per head annually;

(iv) in a great part of the Hanthawaddy and Pegu districts a quantity of salt earth exists, and salt is found all along the tidal creeks; the cattle to some extent therefore are enabled to get grass containing saline matters, and are able to lick up the salt earth, so perhaps do not feel the want of it so much;

(v) I have frequently called the attention of the Burman to the benefits derived from giving salt, but without effect.

From A. H. HILDEBRAND, Esq., Deputy Commissioner, Tharrawaddy, to the Veterinary Instructor, British Burma,—No. 50-1, dated the 16th April 1885.

WITH reference to Land Revenue and Agricultural Department No. 2297 19C., dated the 18th October 1884, I have the honour to report that I have made personal enquiry from cultivators during my tours this season, and I have also received replies to enquiries made by township officers. The result of my own and their enquiries to the questions asked is as follows:—

(1) Salt is always given to cattle when fatigued from work in the sun and at other times when they appear to require it.

(2) The hot months of the year are the season when it is specially given, as it is believed to counteract the bad effects of working in the sun.

(3) Salt is given to working cattle daily during the hot months. It is given from two to four times a month; at other times, as they may appear to require it.

(4) From two to three viss of salt is thus given on an average to each head of working cattle during the year.

(5) This is believed to be enough, and, if salt were cheaper, no more would be given.

(6) The cattle appear to feel and suffer from the effects of the sun if it is not given to them, but they can live and work without it.

(7) Buffaloes get more salt than bullocks, *i.e.*, more at a time, a buffalo from five to six tickels.

(8) The salt is sometimes given with rice-bran, sometimes with straw, and sometimes in a mixture of bran, oil-cake, and water. It is also sometimes given in its raw state for them to lick.

From H. ADAMSON, Esq., Settlement Officer, Tharrawaddy and Prome, to the Secretary to the Chief Commissioner, British Burma, Land Revenue and Agricultural Department,—No. 22, dated the 21st April 1885.

As directed in your No. 2297-19C., dated the 18th October, I have the honour to report through Mr. Frost on the use of salt by cultivators for their cattle.

Cultivators do not give salt to their cattle habitually, and they do not mix it with their food. Occasionally, after a hard morning's work, the cultivator pushes a handful of salt into his bullock or buffalo's mouth. This is the only way in which I have seen salt given to cattle.

From H. L. ST. BARBE, Esq., Deputy Commissioner, Bassein, to the Secretary to the Chief Commissioner, British Burma, Land Revenue and Agricultural Department (through the Veterinary Instructor, British Burma),—No. 108-2, dated the 23rd December 1884.

I HAVE the honour to acknowledge your Land Revenue and Agricultural Department No. 2297 19C., dated the 18th October 1884. Careful enquiries have been made in this district with the following result:—

(1) Salt is generally, but by no means universally, administered to cattle.

(2) It is administered not as an article of diet, or at any special seasons, but for the most part in cases of exhaustion after severe work; less often in cases of chronic emaciation, or when the animal is afflicted with a cold, or with disease of the pupil of the eye. It is regarded thus as a medicine and not as an indispensable condiment, and its use depends, not on the cheapness of supply, but on the general enlightenment on the subject.

(3) In some circles salt is never given at all; in other circles it is given only to bullocks. In the northern circles, where cattle are generally better tended, it may be calculated that about a viss of salt is consumed by every animal each year, chiefly at the

time of ploughing. In the rest of the district the average varies from that amount to nothing at all. Most cultivators who give salt to bullocks and buffaloes alike make no difference in the doses administered to each.

(4) Salt is by no means regarded as a specific even in the limited cases where it is administered. If salt is not available, or if its action fails, there are other *nostra* equally efficacious.

(5) It is generally mixed with the shoots of the [Burmese word] commonly called *tinthamanwe*, which are chopped up fine; more rarely with the root of the [Burmese word] or with pounded fruit of the shapyu or meikthalin. It may be given also in rice-water (warmed), and occasionally even mixed with a little paddy-chaff.

Under the present careless system of cattle-tending and scanty veterinary knowledge, the use of salt as a regular article of diet is not likely to become prevalent, or in way affected by the cheapness of supply.

From W. T. Hall, Esq., Settle[illegible]icer, Henzada, to the Veterinary Instructor, British [illegible]o. 1, dated the 29th March 1885.

As directed by the Secretary to the Chief Commissioner in his letter No. 2297-19C., dated the 18th October 1884, I have the honour to submit through you the result of the enquiries made as to whether Burmans give their cattle salt generally.

2. The questions laid down have been put to cultivators and also to a few cartmen, and their replies are attached.

3. It would appear that cultivators do not, as a rule, give salt largely or generally to their cattle.

Salt is given, however, to bullocks when carting in the dry weather. They are said by some to require it when working in a hot sun, and it is sometimes given during the rains to both buffaloes and bullocks. Then it is rather given to make the fodder (cut grass or straw) palatable.

Salt is nowhere given regularly every day or at certain intervals.

The salt is taken out of what is kept for household use, and so the cultivator cannot well estimate the amount he gives to the cattle.

It does not appear that more salt would be given if it were cheaper.

No cultivators state that their cattle suffer for want of salt.

Bullocks probably get more salt than buffaloes, as they get it in the dry weather, though buffaloes get more at a time when they are given any at all.

The replies of cultivators attached show how salt is given, *i.e.*, with water thrown on straw or cut grass, or sometimes plain by itself.

From G. L. Gheidemann, Esq., Deputy Commissioner, Shwegyin, to the Secretary to the Chief Commissioner, British Burma, Land Revenue and Agricultural Department,—No. 526, dated the 27th April 1885.

I have the honour, in reply to your letter No. 2297-19C., dated the 18th October 1884, to submit the following report on the subject of the consumption of salt by cattle in this country. My enquiries have been confined to the upper portion of the district. Mr. Shaw has supplied me with the results of the enquiry made by him in his sub-division, and I subjoin the body of his report on the subject.

2.—The following facts have been elicited by myself:—

Only those persons give salt to their cattle who are careful of them.

Salt is chiefly given in the months of Tabaung and Tagu (March and April) inorder to counteract the effects of heat. It is sometimes mixed with water and rubbed on the spine during a hot journey as a specific, or a dose is administered after animals have undergone special exertion, or have lost condition, *e.g.*, after the ploughing season. In these cases one tola is given daily from nine or ten days.

Some cattle-owners administer salt regularly three or four times a month, or even once in every four or five days, in doses varying from one to five tolas.

It is very difficult to state the amount given annually to each animal. In one place I was assured that some people gave their buffaloes a handful of salt daily, but it was admitted that these were in the minority.

The price appears to be no object. Too much salt is said to have a bad effect as it acts as a purgative.

There was a general opinion in favour of salt, as it was believed to keep animals in good condition. If cattle suffer from want of salt, the fault probably lies in the ignorance or indifference of the owners. Possibly if salt was more in demand for feeding cattle the price might rise, but I could not ascertain that the present price acted in any way as a deterrent. It is said to cost from Rs. 3 to Rs. 4 per annum to keep a buffalo regularly fed with salt.

There would seem to be no distinction between bullocks and buffaloes in the matter of salt-feeding, though in one respect the replies were somewhat contradictory. In one place salt was given to buffaloes all the year round because they were fond of it, while it was said that some bullocks ate more greedily than others. In another place it was said that some buffaloes would not touch salt, but that all bullocks would eat it.

Salt when given to buffaloes is given unmixed. In the case of bullocks it is mixed with paddy-husk; it is also sprinkled over the straw fodder with which they are fed, when the latter has become old and unpalatable, in order to give it a relish. It is also given as medicine when the stomach is distended, no doubt as a purgative.

It will be observed that in the Sittang subdivision there are villages in which it is not the custom to give salt at all. As the ground there is more or less impregnated with salt, to administer it by hand would probably do more harm than good. There are however villages in the northern parts of the district where salt licks do not exist, but where it is said not to be the custom to give salt to the cattle, though cattle-owners could well afford it. Something would seem to depend on the quantity and quality of the pasturage in such cases.

From G. W. Shaw, Esq., Assistant Commissioner, Sittang, to the Deputy Commissioner, Shwegyin,—No. 1-380, dated, the 18th April 1885.

* * * * * *

The question formed a subject of enquiry in the early part of the dry season in all parts of the sub-division except that where the inhabitants are Karens, which I have been unable to visit. The result of my enquiries is that salt is nowhere habitually or otherwise given to cattle as an article of food. The general reason for this is that it is not customary to give salt or, in other words, that the good effects of salt are not known. People seemed amused with the idea in most places, and asked whether it was a good thing to give salt to cattle. At Kawkame salt was believed to cause diarrhœa, and was in fact used as a purge in cases of distension of the belly from over-eating of paddy. Everywhere it was stated the price of salt was no obstacle, and indeed, where salt can be had for almost nothing over great part of the plain, it is only 14 annas to a rupee per 10 viss. At Billin, which is one of the points furthest away from the salt-making region it is obvious that the salt tax has nothing in the world to do with the fact that the inhabitants do not give salt to their cattle. The people are aware that cattle like salt, and in some places use it as a bait to domesticate wildish animals, or to accustom cattle to a new home (*e.g.*, Ayethema, Kawkame, Zokthok).

In other places salt is a nostrum,—only one among several,—for counteracting the distressing effects of heat. Thus at Hngetthaik after work in the sun, a handful is put into the mouth of a bullock or buffalo "to keep the heat from going in." So at Letpanbu and Letbanbin, in both of which places after the handful has been put into the animal's mouth, a little more is rubbed over the back. The object is the same, "to keep the heat from going in." Bullocks and buffaloes are treated alike, but buffaloes are stated to be especially distressed after work in the sun. In other villages no great distance off, this medicinal use of salt was not apparently known. Thus at Taingkaw, Myinganaing, Sutpann, and Kyoni salt was said never to be given to cattle; it was not known of what good it would be. I may point out that the lower part of the plain, in fact the whole from the edge of the laterite ground to the sea, is saline, and that any natural craving for salt on the part of cattle can easily be satisfied without the intervention of the owners. The only water obtainable on the spot during the dry weather is very brackish, except for the muddy dregs of tank rain-water, so that perhaps cattle have more salt than is even good for them in this region. The Karens are said to give salt to their animals but I have not met with any who do so.

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From F. W. Cabaniss, Esq., Assistant Director of Agriculture, British Burma, to the Secretary to the Chief Commissioner, British Burma, Land Revenue and Agricultural Department,—dated the 23rd April, 1885.

With reference to your letter No. 2298-19C, dated the 18th October 1884, I have to say that I made the enquiries with reference to the consumption of salt by cattle, suggested in the above letter, at the following places, namely, near Mr. Addis's farm at Moulmein, at Kyauktan, Pada, Naungwin, Shwebauk, Maubin, Chyneghat, Bengei, Shwelaung, Thabaung, Ngathainggyaung, Kyunpaw, Ataung, Neikban, Henzada, Kondebin, Daunggyi, Inzeik Daunggyi, Daunggyi Thanbyadaing, Khyetkyun, Ngawun, Nyaungyo (cattle are bred at Nyaungyo), Bokohaw (near Monyo), Myanaung, Kyungalo, Thadangyi, and at Kama. At all of the abovementioned places the enquiries were made of Burman cultivators, and at the places mentioned in the Kyauktan subdivision of Madrasi cultivators also, *with the result that not one gave salt to their cattle* with the exception of cases of sickness, when the Burmese gave salt and water, and the Madrasis a mixture of salt and kerosine-oil.

I have noticed the cattle fighting among themselves to get to a salt lick near Ngathainggyaung on the right bank going up the Ngawun, and at another place near Ataung, and have also recently heard of another lick near Okpo (Henzada). These are the only salt-lick that I know of in Burma. But I believe that they must exist in the hills opposite Ngathainggyaung. I know of none in the delta proper. I have taken an interest in the subject of this letter since 1878 while in Tirhoot (Bengal,) Ghazipore, North-Western Provinces and in Purneah (Bengal). In neither of these places do I believe it is necessary to give salt to cattle as there are plenty of earth salts to be had by the cattle, and, so far as I have been able to judge, they prefer earth salt to the pure salt. This remark is applicable to both wild animals as well as domestic, with the exception of birds, such as doves, which prefer the the pure, refined salt. Salt is given in America regularly, except in the neighbourhood of *good* licks, which are rare in the Eastern States. It is generally given once a week, and about two tablespoonfuls per head are given.

Registered No. 182.]

THE INDIAN AGRICULTURIST.

A WEEKLY
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VOL. X.] CALCUTTA:—SATURDAY, AUGUST 8, 1885. [No. 32.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING JULY 29, 1885]

General Remarks.—Rain has fallen in varying quantities throughout the Madras Presidency, but more is wanted in Bellary, Tanjore, and Madura. General prospects are fair, and have improved in Bellary and Anantapore; in Madura prospects are reported to be discouraging. Harvesting continues in some districts. From Mysore the reports are less favourable than last week: more rain is much needed for recently sown dry crops and for tanks. Good rain is reported from Coorg, where prospects are satisfactory.

In Bombay good rain has fallen in most districts, but more is wanted in parts of Khandesh, Nasik, Poona, Bijapore, and Sholapore. *Kharif* sowings are in general progress throughout the Presidency, and transplanting operations have commenced in places. There has been rain throughout the Berars, the Nizam's Territories, and the Central India and Rajpootana States, and agricultural prospects are on the whole promising.

In the North-Western Provinces and Oudh rain has been abundant, and the prospects of the autumn crop are good. In the Punjab and in the Central Provinces good rain has fallen. *Kharif* sowings are in general progress in the former Province, and have been completed in the latter, where transplanting has commenced.

In Bengal good rain has fallen during the week, except in parts of the Burdwan and Presidency Divisions, where more rain is wanted for the transplanting of late rice. The prospects of the autumn crops and of sugarcane are good, and a fair outturn is expected from the early rice and jute harvests, which are in progress in Northern and Eastern Bengal. In Assam the weather is seasonable, and the state and prospects of the crops are good.

In British Burmah ploughing, sowing, and transplanting are in progress.

Cholera is chiefly prevalent in the Madras and Bombay Presidencies; in other Provinces the public health is generally fair.

Prices are fluctuating in the Punjab, but are generally steady elsewhere. From Bengal no material change is reported.

Madras.—General prospects fair; improved in Bellary and Anantapore; in Madura reported to be discouraging.

Bombay.—Good rain in most districts; more wanted in parts of Khandesh, Nasik, Poona, Bijapore, and especially in Sholapore. Young crops injured by insects in parts of Hyderabad and Upper Sind Frontier, and by rats in parts of Kurrachi; scarcity of fodder in parts of Nasik, Sholapore, Ahmednugger, and in Panch Mehals. Cholera in parts of seventeen, and fever, small-pox, and cattle-disease in parts of seven districts.

Bengal.—Good general rain during the week, except in parts of the Burdwan and Presidency divisions, where more rain is wanted for the transplanting of late rice; elsewhere transplanting is proceeding well; prospects of autumn crops and sugarcane continue to be good; harvesting of early rice and jute progressing in Northern and Eastern Bengal, and a fair average outturn is expected. No material change in prices. Public health generally fair in Bogra, Rungpore, Rajshahye, and Serajgunj. Several slight shocks of earthquake have been felt since the severe shock of the 14th instant.

N.-W. Provinces and Oudh.—Rainfall has been abundant, and *kharif* prospects are promising. Some damage has been caused by heavy floods in the Furrukhabad and Aligurh districts. Prices are generally steady; and public health good. A few cases of cholera are reported from Gorukhpore, Allahabad, Ballia, and Jhansi.

Punjab.—Rainfall almost general. Health generally good, with exception of a few cholera cases in the Rawul Pindi city. *Kharif* sowings in progress; prospects seem favourable. Prices of food-grains rising in the Jullundur, Rawul Pindi, and Peshawur districts, falling in the Ferozepore district, stationary elsewhere.

Central Provinces.—Weather seasonable. Agricultural prospects continue good. Cholera continues in Raipore and Jubbulpore. Prices steady.

British Burmah.—Cholera severe in one district, slight in nine districts; small-pox slight in one district, elsewhere public health good; cattle-disease severe in one district, slight in six districts, elsewhere health of cattle good. Ploughing, sowing, and transplanting progressing. Rains seasonable.

Assam.—Weather warm. Reaping of *dumahi, murali,* and transplanting of *sali* crops progress. Common rice 14 seers 8¼ chittacks per rupee. Tea doing well. Three deaths from cholera from Hailakandi and three from Lukhimpore reported; general health good.

Mysore and Coorg.—Reports less favourable than last week; more rain much needed for recently sown dry crops and tanks. Public health fair; cattle-disease continues in parts. Prices stationary.

Berar and Hyderabad.—Weather rainy. Crops in good condition. Wheat 22 and *juari* 26 seers per rupee, general health good.

Central India States.—Weather cloudy. Prospects and health good. Prices stationary.

Rajpootana.—Wells and tanks full. Prospects good. Health good. Prices falling. Heat moderate; easterly winds; weather cloudy.

Nepal.—Total rainfall 27·29. Rain is now required. Weather very hot. Cholera continues. Transplanting of rice on high lands stopped for want of rain.

Letters to the Editor.

THE AGRI-HORTICULTURAL GARDENS, ALIPORE.

TO THE EDITOR.

SIR,—There was a time when these gardens held the foremost place among Indian Gardens. It belongs to the Agri-Horticultural Society of India, and is so beautifully situated, that I believe it could be made to assume almost any style. The soil is all that can be desired. There is no lack of water, and the large trees are in quite sufficient numbers to give a splendid appearance to the landscape. After some years, I paid a visit to these gardens, and was surprised to see the change that had taken place in their general appearance. It struck me as being in a sad state of dilapidation, with the rank grass growing everywhere, and choking up everything. There seemed to be a deserted air about them. As you enter and turn to the right, you are confronted by a mass of ugly sun-flowers, not even of the superior kind. The bed of roses, right in front, as you enter, seemed neglected and overgrown with weeds. The plants were about as poor specimens of the "Queen of Flowers" as it has been my lot to see. They not only looked sickly and uncared for, but a few of them only had labels with names on them, and some of these were wrongly labelled. The bed of *Marechal Niels*, instead of having supports for the plants (it being a climber), was overgrown with weeds, and the stems straggling upon the ground. The flower-beds along the walk, instead of having specimen plants and season annuals, were overgrown with grass and disfiguring weeds. The clumps of Palms and other plants seemed in a neglected state, the group of *Lagerstrœmias* presenting anything but a healthy appearance. Marvelling at this state of things, I went further on towards the plant houses. The new house—I do not remember to have seen it before—was the only place worth seeing in the garden. Although I did not approve of the design of the house, nor yet of the flat roof, it seemed to be looked after. The old house, I found, had been relegated to a nursery for the rarer kinds of potted plants. There seemed to be no sort of order or method about the place, and the cause of all this was not far to seek. I came to know that the Society have *no European Gardener*. It appears that there has been no such personage for the past two years or more. A native "clerk," it seems, on Rs. 50 per mensem, is the only superintending authority there is. It will be easily understood that in a garden like that of the Agri-Horticultural Society of *India*, a native "clerk' cannot be expected to supervise such a place with anything approaching efficiency. It is strange that while the Agri-Hoticultural Societies of the N.-W. Provinces, the Punjab, and Madras, have trained European Superintendents for their gardens, that of India should have none! Speaking to a friend on the subject recently, I was told that the Deputy Secretary, Mr. Blechynden, Junior, who is acting for the Secretary, is supposed to hold the dual post of Superintendent and Secretary, and that he resides in the Gardens, so that he may be able to superintend it more efficiently: that Mr. Blechynden, Junior, was a really clever man, and knew his business thoroughly. This is all very well, so far as it goes, and I have not the least doubt of Mr. Blechynden's abilities; but the duties of a Secretary are so onerous, and take up so much of his time at the office, that he can scarcely be expected to bestow that attention on the Gardens which is so necessary for its well-being. It requires a good gardener to devote himself exclusively to the work of the Gardens to obtain anything like satisfactory results. I have visited the Gardens at Lucknow and Lahore, and the European gardeners assured me that it was as much as they could do to efficiently superintend their respective charges. I presume that the funds of the Agri-Horticultural Society of India are in a flourishing condition. The list of members is very large; and I believe the revenue realised by the sale of plants and seeds reaches a respectable figure. There is, therefore, no reason why the Society should not have a European Superintendent for their Gardens. I would, therefore, through the medium of your journal, invite the serious consideration of the President of the Society to this subject. It is a pity that the Gardens should suffer for the want of proper supervision.

A VISITOR.

Editorial Notes.

Elsewhere will be found a letter regarding the Agri-Horticultural Society's Gardens at Alipore, to which we direct the attention of the Secretary. Our correspondent has seen the gardens at an unfavourable season of the year, when the growth of rank weeds and grasses can scarcely be kept down. As for the rest, we do not know how far our correspondent may be correct, but the want of a European superintendent would, we should think, be much felt in a garden such as that of the Agri-Horticultural Society at Alipore; but probably the Society have some very good reasons for what they are doing.

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We learn that a memorial has been addressed by the Bombay Presidency Association to the local Government, in support of the prayer preferred by the Tanna memorialists against the Forest Department that the questions in dispute may be preferred to a mixed Commission composed of independent official and non-official gentlemen, European and native, enjoying public confidence, as the "best means for furnishing the materials to eleborate a new and improved forest system, which, while duly conserving the rights of the public, will not press upon any class of the community." Lord Reay, in his speech at Poona, replying to the address of the Sarvajanik Sabba, stated that a Commission had been appointed for this purpose.

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Indications are not wanting that Lord Reay's administration of the Bombay Presidency will mark an era in the history of the people. A Resolution is published in the *Bombay Government Gazette*, dated July 20th, directing that "the forest regulations, whilst preserving the public interests, should be equitable, and liberal in dealing with private interests." The way in which State interests in our forests have been asserted within our own knowledge, would have produced a rebellion amongst any other people, not only for their ruthless disregard of immemorial rights and usages, but for their positively confiscatory character, as in the case of the Raja of Shushang. We are hoping that Lord Reay will interest himself in the silver question. Our readers may remember that he was one of the English delegates at the Paris Conference of 1881, with Sir Louis Mallet.

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We are glad to learn from a contemporary that the Bombay Government has appointed a Commission to enquire into the grievances of the people, especially in the Tanna district, from the operation of the Forest Laws. The Commission is to consist of four Europeans, and three Natives, the Collector of Tanna being the Chairman. "The labours of the Commission will be mainly directed to hearing complaints, ascertaining their reality, and considering the best manner in which provision can be made for supplying the wants of resident agriculturists, as distinct from the trade demands. The Commission will also consider the situation of the hill tribes, in regard to forest regulations, and the suggestion of means whereby the regulations of the Government may best be made intelligible to the people."

For the last ten years have the people been complaining bitterly of the oppression of the Forest Department. In many cases, the wrong has been so obvious that it was not enquiry, but redress, that was wanted. We are glad to see that the remonstrances of the people in Western India have at last forced the attention of Government to the subject, but it would have been better to have instituted these enquiries before the people were exasperated to the verge of rebellion.

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We find that the total capital outlay on irrigation works in Sind, up to the end of the year 1883-84, was Rs. 1,01,13,681, of which Rs. 67,74,709 had been spent on productive works. The actual revenue from all sources was Rs. 28,10,861, whilst the expenses for maintenance and collection amounted to Rs. 14,07,958. On the canals which are classed as productive, the earnings give a percentage of 4·60 on the capital invested, whilst the return from those works for which capital and revenue accounts are kept was, according to the figures, 15·06 per cent. The area cultivated by the aid of the irrigation works was 1,540,831 acres, the revenue from which was Rs. 31,68,358, or nearly Rs. 2·33 per acre. Even this rate is expected to increase, as the people are beginning better to appreciate the benefit of the canals.

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The following, which we take from the *Farmers' Review*, ought to be noted by grape-growers:—Those who have been troubled with their grapes rotting on their vines should now lose no time in bagging them. For this purpose, the paper bags used by grocers, and which cost but a trifle, are used. A good size is 8 by 6 inches. The open mouth of the bag is slipped over the cluster, gathered in around the stem, and fastened with a pin. It is left on until the grapes are ripe. No rotting of grapes so bagged has ever been reported, while clusters on the same vines not thus protected have been ruined. The philosophy of the protection is this: The rot is caused by fungoid spores floating in the atmosphere, which attach themselves to the clusters and cause the rot. The paper bag serves as a perfect protection, and curiously enough, the grapes develop larger, firmer, and of better quality than those not so protected, even when not affected with rot. Grape growers who have gone into the bagging business extensively, claim that leaving the rot entirely out of the question, it pays them in the superior quality of the fruit, and the extra price it commands in the market.

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We are told that the object of the Conference between Mr. Buck, Secretary to Government in the Agricultural Department, Colonel Wace, Mr. Smeaton, and Mr. Fuller, Directors of Agriculture in the Punjab, the North-West, and Central Proces, was to decide on the final proposals for the formation of a Civil Veterinary Department. It appears that Lord Hartington, when Secretary of State for India in 1882, urged upon the Government of India the advisability of establishing a Civil Veterinary Department throughout India, to cope with the diseases which destroy such large numbers of cattle annually. And Lord Kimberley more recently advised that a portion of the Army Veterinary Staff should be transferred to the Civil Department. The scheme which is now being elaborated will, it is stated, include the formation of a Civil Veterinary Department in every province, and there is some probability of Military Veterinary Surgeons being lent during peace time to superintend provincial operations. Madras has a Civil Veterinary Department already, with Mr. Mills at its head, who has been devoting much attention to important experiments in the treatment of cattle diseases.

THE question of establishing a Planters' Provident Fund has been discussed before, but the subject does not seem to have been taken up with any degree of heartiness. The matter has been recently revived, and the *Madras Mail*, in referring to the subject, says :—"There can be no doubt that the benefit to planters of such an institution would be very great. As the promoters of the proposed fund profess not to be bound to any particular mode of action, but to be desirous of joining all the different planting interests in India, the preliminary steps ought to be taken as soon as possible to plan out the scheme. Our contemporary (*Indian Planters' Gazette*) points out that 'planters by combining can secure for themselves all the benefits of a first class Assurance Society, and in addition can retain not some, but all, the profit which no Assurance Society in existence can give them. There is not a village in England, nor a clachan in Scotland, which has not a Friendly Society of some sort, and it says very little for the planting enterprise of India that up to the present time no combined effort for mutual help has been made.' The precise lines on which such a fund ought to be conducted cannot of course be indicated off-hand, and must form a subject of discussion amongst the planters themselves."

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A SCIENTIFIC friend in the Mofussil, who is competent to speak on the subject, tells us that his belief is, that a line drawn from the south-east of Java to the north-west of the Caspian, forming an arc of about 80 degrees on the earth's surface, and of which line Calcutta occupies the central spot—being 40 degrees from either extremity—indicates the main line of volcanic action in Asia. Along this line, and as far as 5 degrees on either side of it, earthquakes may occur at any time ; their severity being generally greater in proportion to their nearness to the extremities of the zone, and less as they approach the middle, where an enormous thickness of the earth's crust has been depressed. Hence Cashmere and Tenasserim are more likely to suffer from earthquake than Calcutta. But there are some exceptions to this general rule, according as the subterranean gases and electricity are conceived to be more or less active, beneath any given locality. For instance, Simla is thought to be in greater danger than Chumba ; and Tehri (Gurhwal) more than either. It is surmised that some severe shaking will be felt before long in the southern part of the Malayan Peninsula. Our informant holds that the inhabitants of Calcutta have far more to fear from inundations, than from earthquakes ; and he suggests the construction of *protective dykes*, as a security against the too probable storm-wave.

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WE print elsewhere *in extenso* the report on experiments at Alon, submitted by Mr. R. Romanis, Chemical Examiner, British Burmah, dated 29th May, 1885. As far as we can make out, the experiment with chemical manures does not seem to have resulted as favourably as might have been expected. The tabulated statement regarding the outturn of grain and straw, is a little obscure. It is not stated whether the figures mean lbs., cwts., tons, or maunds ; but we presume they are intended to represent lbs., as there is an allusion made in the paragraph immediately following, about an "increase of 250lbs." The jute cultivated was a failure, for it is said that "very little of it was fit for making fibre." So likewise, was the sorghum, the juice of which contained about 17 per cent of solid matter, of which only half was crystallizable sugar. "The juice when evaporated gave a dark treacle of a bitter taste." Mr. Romanis does not think sorghum is suited to Burmah. He says it is not so rich in sugar as Sugarcane, and the manufacture of sugar from it requires far more skill. He adds that although it is true it occupies the ground for only four months, it is the same time as rice, and there appears to be no advantage in replacing rice by sorghum. That the cultivation of sorghum in the United States is the result of protective duties, and that it has there taken the place of maple sugar, but under natural conditions. He does not think it could compete with sugarcane, and is of opinion that it seems unnecessary to make any further experiments with sorghum. The working expenses of the experiment amounted to Rs. [illegible]

THE uses of paper, as we know, are many and varied. Another use has, however, been found for this material, *viz.*, "paper faces" for clocks. The *Paper-Makers' Journal* has the following on this subject :—"The manufacture of cheap clocks and watches has come to be one of the great industries of the United States. A prominent engraver there recently mentioned that several years ago officers of the Ansonia Clock Company came to him to know if he could not make an engraved paper imitation of the French porcelain face that was then used on their clocks. He spent several hundred dollars in the experiment, and finally gave it up in despair, through inability to find paper that would answer the purpose. The Company refused to let him stop his experimenting, and he finally hit on a glazed and enamelled paper, which answered the purpose. He has made 12,000,000 to 14,000,000 clock faces for the company at a cost of about one cent each. The old cost for porcelain was a dollar, which is the present cost of a clock complete. Machinery has been specially invented for turning out the paper faces. This circumstance is a fair instance of American ingenuity, persistency, and invention."

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AT the present time, when there is so much controversy going on respecting the silver question, our readers will be interested to learn that Count Walewski, an eminent French financier, at one time Minister of Commerce under the Empire, predicted as follows on the subject of the demonetization of silver :—

"The demonetisation of silver by any great civilised nation must produce the following results :—1. The international trade of the world will instantly show signs of decline, to the special injury of countries having the largest international trade.—2. The spirit of public enterprise in railroads and other useful undertakings will be checked, and consequently the general progress of civilisation will suffer.—3. The decline in prices will compel countries internally to depart more and more from the principles of free trade towards a policy of protection.—4. The nations will be divided into two groups, the one trading on gold, the other on silver, and this will render commerce between them unsafe and precarious.—5. Throughout the world a decline in prices will follow, injurious alike to owners of real property and the labouring classes, and advantageously only, and unjustly so, to the holders of bonds and similar securities.—6. One of the principal difficulties in this period of general depression will be, that people will look for its causes in all possible directions. The advocates of the gold standard will offer all possible groundless and fantastic reasons of a secondary nature only, and the real cause, the demonetisation of silver, will be overlooked, until the perspicuity of the phenomenon and dire necessity shall force thinking men to point it out."

Needless to say that these predictions have been fulfilled.

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A COMMITTEE has been appointed by the Madras Government to report whether any of the buildings at the Saidapet Farm could be made available for the use of the Veterinary Hospital. It appears that there are no stalls available for the Veterinary Hospital in any of the farm buildings, and Messrs. Benson and Robertson both object to the conversion of any part of the building now used for the accommodation of the farm stock, into stables for the hospital ; their grounds being that it would be dangerous to locate any of the stock required for the working of that part of the farm, which is [illegible] be an annex to the Agricultural College, anywhere near where animals suffering from contagious diseases are likely to be placed, or in the neighbourhood of a building where dissections are to be carried on. There are other objections, more or less valid, to the present farm stables being made over to the Veterinary Department. The gentlemen consulted in the matter being all professionals, and their several opinions not being unanimous on all the points at issue, the Officiating Director of Agriculture and Revenue Settlement has suggested that a Committee composed of Mr. J. H. Garstin, as President, with Messrs. Robertson, Shaw and Mills, as members, be appointed to enquire and report—

I. Whether any of the existing buildings at the Government Farm can be employed or converted to use as stabling and a dissecting shed for the Veterinary Hospital, and, if not, what valid objections to doing so exist?

II. Where, if using any of the existing farm buildings for the purpose mentioned above, is deemed undesirable, the new stabling and dissecting shed should be built?

III. What should be the extent and character of the extra accommodation to be provided, and what its approximate cost?

IV. Whether there is any valid objection to the retention, in their present position, of the buildings forming the existing Veterinary Hospital?

This proposal has been sanctioned, and we shall await, with some interest, the report of the Committee.

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We take the following statistics regarding British exports and imports of paper from the *Paper Makers' Journal*:—Our exports of paper still show an increase, though other articles of home manufacture are exported to a smaller amount than a twelve-month ago. During April there were shipped from the United Kingdom 72,078 cwt. of paper, valued at £147,008, as compared with 60,198 cwt., valued at £128,282, in the same month last year. A corresponding advance is noticeable in the outward trade done during the first four months of the year, the actual export having been 268,336 cwt., valued at £561,148, against 241,427 cwt., valued at £524,308, at the same date last year. The import returns show, however, that an increased quantity of foreign paper has found a market in the United Kingdom during April, the imports having amounted to 118,242 cwt., valued at £102,571, as compared with 110,236 cwt., valued at £108,727, in April, 1884. While the quantity has augmented, there has been a decrease in value, which would seem to show the continually diminishing price of foreign paper. The imports for the four months compare, on the other hand, advantageously in favour of the current year, the figures for which are 427,491 cwt., valued at £401,252, against 462,246 cwt., valued at £443,567, at the same date a twelve-month ago. The above totals are exclusive of the re-exports of foreign-made paper. In stationery there has been a contraction of the foreign demand during the four months. The export figures for the first four months of the year represent a value of £252,039, against £260,748 a twelve-month ago. Australia is the only country with which our foreign trade in stationery has increased, as compared with 1884, and even here the increase has been very slight.

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It seems that the colony of Trinidad is not as bad as it has come to be regarded. *The Colonies and India*, writing on this subject, says:—"Mr. Prestoe, the Government Botanist of Trinidad, at the request of the Tobago Agricultural Society, has just paid a visit of inspection to Tobago, where several estates have lately gone into liquidation, with a view to suggesting some form of cultivation which shall replace sugar. He has expressed himself as greatly surprised at finding the island so different from what casual reports had led him to expect, and he declares that it is superior in natural advantages to either Grenada or St. Lucia. Be that as it may, he saw on his tour round the island, tracts of land which, as he expressed it, 'seemed to have been formed especially to grow cocoa,' alongside of other tracts, abundantly watered, which he described as 'magnificent cane-growing land, on which central factories ought to be established.' His formal report will shortly be issued, which we expect will help to dispel the unaccountably bad impression which prevails about the colony; but in the meantime an effort is being made to form a company to take up one of the recently sequestrated estates for the purpose of adopting Mr. Prestoe's recommendations. An estate of about 3,300 acres, together with all the machinery, buildings, and live stock thereon, is to be purchased for 4,000*l.*, or little more than 1*l.* an acre—one-half to be paid at once, and the rest in two years. How many men are there in this country who would be glad to purchase such an estate at such a price, for mere purposes of recreation! Properly handled, such a property ought to yield an enormous profit, for even under sugar cultivation the land is really worth ten times the amount proposed to be paid for it. The venture will be before the notice of investors simultaneously in the West Indies and in London, and there ought to be no difficulty whatever in raising the money. If the such venture succeeds, the chance of buying up another such an estate on such terms is hardly likely to occur."

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We are told that the Government of India are taking in hand the question of improving the Indian wheat trade, both in regard to care in cultivation and increased facilities of carriage to ports of shipment. The Bengal Government has been called on for its opinion upon the points which have already beed discussed in Bombay, the North-Western Provinces, and the Punjab; and the Lieutenant-Governor has referred the matter to the Director of Agriculture for report. Bengal is mainly interested because of the position of Calcutta as a port from which wheat is shipped in large quantities, but there is some wheat grown in Behar, and the proposals in regard to improved cultivation might perhaps be usefully applied there. The Government is at present extremely ignorant regarding wheat cultivation in the province, which illustrates how necessary it was that some such official connection with agriculture, as that provided by the newly-formed Agricultural Department, should be established. The Lieutenant-Governor "fears that anything like accurate knowledge of detailed statistics of the cultivation and trade in wheat in these provinces is as far from attainment at this moment as when inquiries into this branch of the subject were first set on foot in 1879," and does not think his Government will be in a position to prosecute such an inquiry with any reasonable hope of success "till village establishments are organised in Bengal." But his Honour desires that meanwhile the Agricultural Department will collect accurate knowledge on the subject, as far as lies in its power, and disseminate any information that may seem likely to be of practical use. Calcutta is interested in the ventilation of the question to the extent that some of the proposals made contemplate the sorting and weighing of the wheat up-country, and its delivery immediately from the railway waggons on board ship, without any necessity for examination and weighment here.

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The *Paper-Makers' Journal* notices a new material to which the name *Agalite Fibre* has been given. It is intended to improve the colour and finish of papers without the necessity for extra rolling, and from the samples sent to our contemporary, he is disposed to endorse the declaration made on its behalf, that it is likely to be acknowledged by paper-makers as a *succedané* rather than as a loading for paper, and superior to any substance of the kind heretofore used for that purpose. At all events, the testimony of paper-makers who have already proved its merits is set forth briefly and emphatically by Messrs. G. F. Green & Co., of 3, George-yard, Lombard-street, who are the sole agents for the Agalite Fibre in the United Kingdom. The fact of its being called a *fibre* is significant, and as it is claimed for it not only that its fibrous nature can be discovered under the microscope, but that this quality causes it to adhere to the pulp, so that 90 per cent of the material is retained in the paper, the characteristic may well be regarded as an important one, especially as it is averred that the Agalite is a substitute capable of taking the place of straw as a *succedané*. It is stated that the backwater from the machine where this material is used, passes away almost clear, and that the fibre itself is absolutely free from grit, sulphur, iron, and lime, and is therefore above comparison with other mineral substances, used for a similar, or rather, for an inferior purpose. There are two preparations of the fibre—one coarse, the other fine, and Messrs. G. F. Green & Co. are now prepared to forward bags of from 200 lbs. to one ton weight, so that paper-makers may make trial of a sample. It is understood that members of the trade who have tested its remarkable qualties have repeatedly and largely increased their orders, and that it is being actively introduced to foreign manufacturers, so that as it is to be obtained from only one mine, Messrs. Green & Co. are naturally desirous of bringing it before the trade in England.

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The following facts about race relations in the United States, which we take from the *Planters' Gazette*, are interesting:—"The rapid progress of the blacks towards numerical supremacy in the United States is beginning to attract anxious attention Some startling figures bearing on the subject were given by the Reverend Dr. Allen, secretary of the Freedmen's Aid Society, in the Presbyterian General Assembly at Cincinnati, on the 25th of May. Twenty years ago, he observed, at the close of the war, there were in the Southern States 3,947,000 coloured people, and now there are more than 7,000,000. Then there were in Mississippi 220,000 negroes ; now 650,000. Then there were in South Carolina 400,000 ; now more than 600,000. Five hundred coloured babies are born in the United States every day. The coloured population of the United States doubles every twenty years ; the white population only once in thirty-five years. Eight years will not have passed before the negroes will be be in a numerical majority in some of the Southern States. At the present rate of increase, in 1985 there will be 96,000,000 white people in the United States, and 192,000,000 coloured people. The day, in Dr. Allen's opinion, is not far distant when it will be a physical impossibility to continue the present practical disfranchisement of the coloured man of the Southern States. In South Carolina he has bought and paid for 270,000 acres of land which he cultivates. In the South he pays taxes on 91,000,000 dols. worth of property. He is editing, printing, and publishing 106 newspapers, and yet of the 7,000,000 coloured people of the country, more than 6,000,000 cannot read or write. The Americans may take to themselves one consolation under these circumstances. Their prospects can be hardly more black than our own are at present on this side of the Atlantic."

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Referring to the subject of food adulteration in general, and to the manufacture of spurious butter and cheese in particular, the *Farmers' Review* says :—"The United States of America is not the only country in the world where food is adulterated, although from foreign papers one would be led to suppose that it is accountable for all the abominations placed upon the markets as food for man. In the past, America has had a bad name for turning out a large amount of spurious butter and cheese, but we learn that other countries have begun to compete so keenly that there will be less profit, and thus fewer engaged in the business in this country in the future. In regard to the manufacture of patent butter in foreign countries, a few facts may be of interest. In Russia, manufactured butter is turned out by four works, situated respectively at Petersburg, Moscow, and Odessa. The principal seat of the industry is at the first named city, where it is carried on on a very extensive scale. In addition to manufacturing artificial butter in a finished state for local consumption, a Franco-Russian company exports large quantities of raw material, or oleomargarine, to Holland and other countries, where it is worked up into markotable spurious butter. The quantity of raw fat annually employed by the company at St. Peterburg alone exceeds 3,000 tons. Considerable quantities of spurious butter are exported from St. Petersburg to western countries, particularly to England, under the general designation of 'dairy butter,' and only occasionally under that of artificial butter. In Russia there seems to be no law to prevent this open trade of artificial butter under a false name, but in Denmark it is different, for there very stringent regulations are in force ; for under a penal code the inducement, by false pretences, to purchase an article which is not what it is represented to be, and for a price out of proportion to its real value, is punishable by imprisonment on bread and water for terms varying from five days to six years. At Washington the sum of $2,000 has been voted for an inquiry in the United States, as to the extent and character of the adulterated food drugs imported, and in Congress in the early part of last year, three bills were introduced with the view of preventing the manufacture and sale of adulterated butter, and the exportation of articles made in imitation of butter and cheese. Last week we had occasion to speak of the injury to the dairy interest from the large amounts of spurious and inferior cheese thrown upon the market, and we trust that not only may something be done to stop the tendency to produce poor cheese, but also to make the production of artificial butter illegal. Let us have pure dairy products by all means."

The following is a summary of Messrs. William, James, and Henry Thompson's Fortnightly Circular of Indian Tea, dated London, Thursday evening, 2nd July, 1885 :—The market, as is usual at this time of the year, has been very quiet, and though prices have ruled firm at the auctions, there has been but little enquiry between whiles privately. The sales for the fortnight have amounted to 14,700 packages, of which 11,600 were of Indian growth, including the last 3,000 chests of the Assam Company's crop. These sold freely at a material advance on estimate on arrival, while for other marks of Old Season's, the last quoted prices were maintained. Of New Crop, 2,000 packages have been offered and mostly sold, some particulars of which are below. The prices were not so good as for the first few parcels, and in some instances the quality also was inferior. The sales of Ceylon Teas have been rather heavy, about 3,000 chests having changed hands, averaging nearly 1s. 3d. per lb. The Season 1884-85 for India may now be considered virtually closed, and buyers are waiting with some interest for the first cargoes of 1885-86, which, owing to the block in the Canal, have been delayed some ten days or a fortnight. The *Glengarry*, from China, with the first new season's Teas, is expected on the 6th instant."

Particulars of recent sale of New Season's Teas :—

Barnsbog	… 89	Packages,	averaged about	1s. 8½d.	per lb.
Ring Tong	… 198	,,	,,	1s. 8d.	,,
Washabarrie	… 100	Hf.-Chests	,,	1s. 7½d.	,,
Mugia	… 91	Chests	,,	1s. 3½d.	,,
Soom, Darjeeling	… 100	,,	,,	1s. 4½d.	,,
Tumsong	… 86	,,	,,	1s. 4d.	,,
Balasun	… 68	,,	,,	1s. 5½d.	,,
Dwarbund B. I. T. Co.	52	,,	,,	1s. 0d.	,,
Thibannah	… 68	,,	,,	1s. 0d.	,,
Tukvar Co.	… 119	,,	,,	1s. 3d.	,,

The Calcutta sales, held on the 25th, comprised about 7,000 packages and realised an average of 11½ annas. The quality of the Tea now coming down from Darjeeling and Assam is reported good, but rather inferior from Cachar and other districts.

The following is the revised scale of charges on Tea agreed upon by the Dock Companies and Private Bonded Warehouse keepers :—

PER PACKAGE, WEIGHING GROSS.

	1[illegible]0 lbs. @ 2[illegible] lbs.		130 lbs. @ 1[illegible] lbs.		80 lbs. @ 129 lbs.		60 lbs. @ 7[illegible] lbs.		45 lbs. @ 5[illegible] lbs.		35 lbs. @ 44 lbs.		17 lbs. @ 34 lbs.		Not exceeding 16 lbs.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Landing and Housing Rate—Private Sale ..	4	6	2	0	1	6	1	4	1	2	1	0	0	7	0	3
Management Rate—Public Sale ..	3	2	2	6	2	0	1	6	1	4	1	3	0	8	0	4
Bulking and Taring ..	2	3	1	10	1	6	1	3	1	0	0	10	0	8	0	6
Bulking, Taring, or Weighing Nett, separately ..	1	6	1	3	1	0	0	10	0	8	0	7	0	6	0	5
Weighing Nett and Bulking,	3	0	2	6	2	0	1	8	1	4	1	2	1	0	0	10
Rent per Week ..	0	1	0	0¾	0	0½	0	0½	0	[illegible]	0	0¼	0	0¼	0	0¼

These charges will take effect on and after 1st July, and will be subject to a discount of 10 per cent from the Private Warehouses and Wharves.

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The Superintendent of the Madras Survey has suggested that the following subjects should be comprised in the test to which Revenue Inspectors are to be subjected :—

1. **Scales of Maps.**
2. **The Chain of 66 feet, its use and adjustment.**
3. **Demarcation of Village boundaries and their sub-divisions,**
4. **Demarcation of fields.**
5. **Field measurement.**
6. **Field-plotting.**
7. **Computation of field areas by ordinary mensuration and by means of the computing scale.**

The Madras Government, in passing orders, have laid down the following ruling—The Government agree with the Superintendent of Revenue Survey as to the nature of the Survey Test which Revenue Inspectors should be required to pass, and are pleased to direct that, from or after the 1st April 1888, no person who shall not have then passed such test shall be eligible for appointment as a Revenue Inspector, or for promotion to the new rates of pay, or to a higher grade. In the case of officers who are now Revenue Inspectors, the Government are of opinion that they should be attached on duty—as Assistant

Collectors now are—to a survey party for a period not exceeding six weeks in any case. When and what number of officers shall be allowed to go for instruction may be left to Collectors to decide. Arrangements should be made, however, to meet the reasonable requirements of all officers wishing to qualify. Persons not already in the service, nor in the grade of Revenue Inspectors, must make their own arrangements for instruction in surveying, unless the Collector certifies that he wishes in any particular case that a man, whether in the service or not, should be attached for instruction in view to appointment as Revenue Inspector. Any person not so designated by the Collector, but who is already in the service, may, as the Board suggest, be reasonably required to avail himself of some period of authorized leave for the acquisition of the special knowledge. No person should be admitted by the Survey Department for instruction without a certificate from the Collector, and where the person is not in the service already, except on a payment of a fee of Rs. 5. The fees thus collected will be credited to Government. No fee will be exacted from officers already in the service of Government. The examination should be conducted by Deputy Superintendents of Survey in the districts, who will grant certificates of qualification. Such certificates should be forwarded for information and record to the Collector's office.

ENSILAGE *vs.* GREEN FODDER.

I.

LAST week we published a letter from Mr. D. B. Allen, of the Bengal Agricultural Department, upon this subject, in which he endeavoured to show that the generally received opinion that ensilage was superior to fodder in its green state, was erroneous, and was to be received with caution; and he quoted Dr. Aitkins' remarks in support of his argument. We had taken the liberty of commenting upon his previous paper, "Hints on Ensilage"—and it was in answer to these remarks that Mr. Allen addressed us. We do not for a moment wish it to be understood that we regard *all* ensilage fodder to be superior; we are chiefly concerned with the production of silage ~~*as it should be,*~~ in accordance with the principles governing the process, which has created such a revolution in the feeding matter of stock. We are firmly convinced that silage, properly prepared, possesses qualities superior to ordinary fodder in its green state; and in this opinion we are borne out by the testimony of many qualified persons, in a position to speak with authority on the subject. The *practical* results obtained by feeding cattle, &c., on silaged fodder prove conclusively its superiority over the green article. We shall, in this paper, quote our authorities in support of this view.

Not to go very far back, or indeed very far from Calcutta, we shall instance the ensilage experiments carried out under the direction of Brigadier-General H. C. Wilkinson, C.B., Commanding the Presidency District, during 1884. In his "notes" the General says:

> "Ensilage has been found by experiments to be more fattening and nourishing than green grass, and cows fed upon ensilage give more milk, and their milk yields more cream, than when they are fed upon grass."

He then refers to sweet ensilage, which is really what Mr. Fry has striven to explain in his very important work. General Wilkinson says:

> "A little partly-made sweet hay is put in the bottom of the silo (to act as yeast does in bread-making), green forage is then lightly loaded in on the top of the partly made hay to the depth of about a yard, this is not pressed down or trampled, so that strong fermentation sets in at once. As soon as a temperature of 122° Fahrenheit is reached, the forage is firmly trampled down, the "bacteria" of sour fermentation having been destroyed by this heat. More green forage is now added to the depth of another yard, and the process is continued as before till the silo is quite full, when it is covered over like any other silo.
>
> "If every portion of the contents has been duly heated to a temperature of 122°, the result will be ensilage as sweet as good old hay."

With regard to the feeding qualities respectively of ensilage and green grass, the following table, supplied to us by General Wilkinson, will speak for itself. We have no reason to doubt the accuracy of this statement:—

Table showing the comparative value of green grass and ensilage as a fattening, nourishing, milk and cream yielding food.

GREEN GRASS.

No. of Cow.	Date of Experiment.	No. of Days.	Weight. Loss.	Weight. Gain.	Yield of Milk. Total Yield.	Yield of Milk. Decrease.	Yield of Milk. Increase.	Quality of Milk.
					lbs oz			Fig: of Merit.
No 1	1 11 84	28	3½	0	154 5	...	...	5½
	...	...	...	...	...	...	...	...
No. 2	...	...	...	...	...	...	...	...
	1 12 84	28	...	...	114 10	32 5	0	7
No. 3	...	...	...	...	...	...	...	...
	1 12 84	28	25	0	119 3	47 11	0	8½
No. 4	1 11 84	28	11	0	116 8	...	...	11
	...	...	—	...	...	...	...	...
Total ...	...	112	39½	0	504 10	8 0	...	8

ENSILAGE.

No. of Cow.	Date of Experiment.	No. of days.	Weight. Loss.	Weight. Gain.	Yield of Milk. Total Yield.	Yield of Milk. Decrease.	Yield of Milk. Increase.	Quality of Milk.
					lbs. oz.			Fig: of Merit.
No. 1	...	...	...	...	...	...	...	...
	1 12 84	28	0	16	163 8	0	9 3	8½
No. 2	1 11 84	28	0	16	140 15	...	...	9½
	...	...	...	...	...	...	...	...
No. 3	1 11 84	28	0	51	166 14	...	...	10
	...	...	...	...	...	...	...	...
No. 4	...	...	...	...	...	...	...	...
	1 12 84	28	0	23	136 0	0	19 8	12
Total ...	...	112	0	106	613 0	0	2811	10

N. B.—The quality of the milk is indicated by figures. 0 represents absolutely skim milk, and 30 represents pure, thick cream; thus the higher the figure, the more cream there is in the fresh milk.

2. It will be seen by the "Weight," and "Yield of milk," columns, that all the gain in weight and increase in yield was due to the ensilage, and all the "loss" to the green grass, though the time of year was most favourable to green grass.

We direct particular attention to the note at the bottom of the statement, especially 2. With these results before us, it seems scarcely necessary to pursue the subject further, in order to prove the superiority of ensilage over fodder in its fresh, green state. Whatever may be the results, so far as scientific experiments are concerned, and whatever may be the opinion of chemists from a theoretical point of view, the proof of any system can only be obtained satisfactorily by a *practical* application of it. To quote a hackneyed phrase, "The proof of the pudding is in the eating of it." We remarked, some three months back, in reference to these very experiments, that—

> "It would be almost too much for one's credulity—were the facts not vouched for—to be told that two cows when fed on ensilage for 28 days gave an increase of as many seers of milk, and two similarly fed on grass, decreased by 80 seers of milk in 28 days!"

Theories are all very well so far as they go; but if they cannot be borne out by facts and by practical tests, they fall to the ground. So far as the farmer is concerned, it has been abundantly proved that in almost every instance where stock were fed on ensilage, the results proved the superiority of silage over fodder in its green state. We could quote the testimony of innumerable individuals, European and American, including the evidence of members before the Royal Ensilage Commission, in support of our views; but Indian testimony seems to us to have most force. In our next, we shall treat the subject from a theoretical point of view.

CULTIVATION EXPERIMENTS IN THE ARAKAN HILL TRACTS.

MR. F. C. FANSHAWE, acting Deputy Commissioner of the Arakan Hill Tracts, has submitted an interesting report on experimental cultivation of certain economic products in these outlying tracts, but the results obtained by him do not encourage the hope of bringing these remote regions, peopled by ignorant savages, within the pale of civilized cultivation of useful products for the market.

There are two gardens in which these experiments were carried on; one at Paletwa and the other at Kyoukpandaung. A sum of Rs. 1,000 was allotted for the year 1884-85, of which Rs. 889 were expended. Since the last report was submitted in May 1884, the gardens do not show any marked improvement. The money is chiefly spent on gardeners' wages and coolie hire, as it is found very difficult to keep the gardens free from weeds and grass during the rains, and nearly half the allotment is spent on coolie hire for this purpose.

The Paletwa garden occupies an area of 4½ acres. Its situation is unfavourable, the ground being low and swampy in some parts. The *Tea* plants here are said to be looking healthy, and have been leased out for one year for Rs. 100. The *Potatoes* proved a failure; but this was owing chiefly to the seeds having arrived in a bad state; another reason being that they were not planted as they should have been, *i.e.*, in light, sandy soil, and on ridges; but were sown on heavy soil, on low ground, and in trenches. In a country possessing a naturally humid climate, with a heavy rainfall, this result was to be expected under the circumstances. Mr. Fanshawe, however, is of opinion that the experiment is worth trying again this year. The *Pepper-vine* seems to have done fairly well, and it is intended to plant it extensively on the Burmese method of growing betel-vines. The *Cinnamon* has been a complete success, and "a small forest of them" is said to exist at Kyoukpandaung. The variety of *Coffee* grown was the Liberian, and the plants appear to have done well. The *Arabian coffee* was also tried, but it did not get on well. *Manilla hemp* is said to get on well, and the same is said of the *Betel-vine.* Two *Cocoa* trees have reached the height of 9 and 4 feet respectively, and may be pronounced a success. There are no *Sugar-canes* in the Paletwa garden, but Mr. Fanshawe thinks it would pay to plant them. Among *Fruit*, the *Mango*, the *Plantain*, and the *Pine-apple* are mentioned. The last-named is said not to do well. An important feature in the report is the remark about *Khaki cotton.* A little of it is grown for home consumption, but very little is exported. Mr. Fanshawe thinks some seed might be given to the cultivators as an experiment, as the price is double that of white cotton; and that when the peasants find that it will pay well, they would probably take to cultivating it regularly. The Chief Commissioner has sent seeds to Mr. Fanshawe, and we shall be glad to hear the result of the experiment. There were no new experiments during the year.

Mr. Fanshawe, we regret to see, does not seem to take a hopeful view of the utility of the garden at Paletwa. He says:

> "The experimental cultivation in the Arakan Hill Tracts has done little or nothing, I am sorry to say, to induce the peasantry to try new products, and I am afraid that, as long as they live the life that they do at present, they will never attempt anything new. Their staple products are of course rice and sessamum for home consumption, and tobacco and cotton for both home consumption and export. Their time is pretty well taken up in their taungyas and tobacco fields, and the month or two in which they have nothing to do they spend in a series of feasts. The ground used for the cultivation of tobacco could not be used for permanent garden land, as it is all under water during the rains; and if taungyas were cut far from the water, the labour would be immense to keep the ground properly watered during the hot weather, and that is just the time that they are all hard at work cutting their taungyas for planting paddy, &c. They are too lazy and indolent to put themselves out in any way, and as long as they have enough to eat and drink, with a few rupees to spend yearly, they are quite contented. Different kinds of tobacco and cotton they would willingly sow, I think; and if Mr. Bridges supplies seeds next year, as he has very kindly offered to do, I have no doubt that the experiment will be a success.
>
> Even if planters were induced to settle up here, I do not think they would find cultivation profitable, as the great difficulty of course would be coolie labour. The peasantry here simply would not work regularly, and all the labour would have to be imported, and even then I am afraid the coolies would be constantly down with fever, for the first year or two at any rate, and unless they were paid at ruinously high rates, they would desert whenever they got a chance.

Burmese peasants are, as a rule, of the stamp Mr. Fanshawe has described, and much cannot be expected of them.

With regard to the garden at Kyoukpandaung, which is of more pretensions, it may be said that *Tea* and *Cinchona* thrive well, and may be cultivated with success.

The tea garden is already assuming large proportions, and the time is coming when, with a little skilled labour for curing processes, the trees will yield a return which ought to make the garden more than self-supporting. The number of trees and young plants exceeds 12,000, and this number is capable of large extension, so as to form the nucleus of a fairly good tea estate, which would pay well in any part of the country where labour was procurable at ordinary low rates.

The fact, too, that there are over 400 cinchona plants at Kyoukpandaung, all doing well, particularly the larger ones, seems to prove that the locality is favourable to the growth of this very important vegetable product.

Potatoes and *Coffee* were failures. *Fruit trees,* such as raspberry and apricot, have done well. *Tobacco* seems to have proved successful, and Mr. Fashawe has been supplied with seed for extended experiment. The tobacco produced is said to be very good of its kind, and fetches a good price in the local market. Looking at the experiment as a whole, it may be said to have been fairly successful; but in our opinion something more than merely official supervision, such as that exercised by a Deputy Commissioner, is needed to prove to demonstration whether the results obtained cannot be improved upon. The Commissioner, Colonel Sladen, is of the same opinion, as he says—

> The experiment need not for the present be repeated until the conditions are more favourable, and we can count upon more skilled supervision.

It has, however, been decided to continue the grant of Rs. 1,000 for another year. Let us hope that the results of the next year will be more satisfactory.

THE RE-SETTLEMENT OF THE CENTRAL PROVINCES.

THE result of Mr. CROSTHWAITE'S visit to Simla is, that the re-settlement of the Central Provinces will be undertaken, without any new survey of the land. We believe the decision to be a wise one. The survey of 20 years ago was so thoroughly well done, that it is impossible to believe that there can be any necessity of a new one within 20 or 30 years. No one who is familiar with the Settlement reports of these districts, that appeared at intervals from 1860 to 1869, can forget the conspicuous ability by which they were marked. The one failing that characterized them all, was the pitching of the assessments at rates that positively mocked the necessities of the treasury. Sir RICHARD TEMPLE was permitted at the outset to lay it down as a principle, that if the Government would but give the land away, by fixing the assessments at purely nominal rates, the growing wealth of the people would cause the public treasury to overflow with receipts from the excise and customs duties. In his very first report, he gave expression to this conviction in the terms we have now employed.

So sensible did he himself become of the wild mistake that had been made, that it became impossible in after years to get a copy of this report at all. It has been distinctly affirmed that Sir RICHARD TEMPLE himself withdrew all copies of it from the records. We had a copy in our possession for some years, but having lost it, were never able to procure a second one.

The Government is now face to face with the hard necessity of doing what it can to redeem the error that was then made, by raising the assessments to rates that will relieve the rest of India from the burden which the heavy deficit in these provinces has cast upon their shoulders. They are already in arrears to the public treasury to an amount of money that we shall never be able to recover from them now, but the assessments must be raised in the new settlement to rates that will at least relieve the other provinces from carrying this burden any longer. If Mr. CROSTHWAITE finds it impossible to raise the rates to their proper level at one stroke, he must at all events make a substantial beginning, and must in that case issue no leases with a longer currency than ten years. The thirty-years' lease system has become an error everywhere owing to many causes. The growth of an entirely new export trade, the immense outlay that has been made upon the railways of the Central Provinces, and the great change that has taken place in the value of money in the last twenty years, make it impossible to think of any renewal of the expiring leases upon the old terms. Mr. Crosthwaite's long experience and ability, peculiarly qualify him for the work he has to do, and we believe he may be trusted to hit the right mean. He sees now in 1885 as clearly as ourselves, the profound delusion of the views under which settlements of 1860—69 were made. Our fear is that he may lack resolution to face his task with the full courage it demands. The general result of the Temple settlement has been, that the provinces have barely met their own expenditure, while they fall short of their proper share of the Imperial burdens, by nearly a million sterling a year. Now, in justice to the rest of India, the arrears and deficit that Sir Richard Temple's settlement has brought upon us, ought to be liquidated, but as that is hopeless, all that we can do is to change the aspect of matters for the future. We charge Mr. Crosthwaite to do it resolutely.

THE BENGAL TENANCY ACT.

THE attention of Parliament has been directed to the passing of this Act by Lord KIMBERLEY, in the *Indian Statesman* of Saturday last, which went home by the Mail, in the following terms :—

The announcement that the Bengal Tenancy Act finally passed the Indian Council at Home on the 22nd June, when Lord Kimberley had virtually ceased to hold office, has created a feeling of profound disappointment in these Provinces. His Lordship's act was a most improper one, for he had distinctly promised that the Act should not pass the Council until he had received and weighed with attention, the memorials that he knew were being addressed to him from the various Land Associations of Bengal. He has distinctly violated his word. His lordship knew well, in particular, that the memorial of the Landholders' Association of Bengal, which is a most able and exhaustive criticism of the Bill, only left India on the 13th June ; and he went down to the India Office, and signed the despatch on the 22nd or 23rd, well knowing that the Memorial was on its way ; that it was the great final effort of the zemindars to save themselves from ruin ; and that he had distinctly promised them that the Bill should *not* pass the Council, until he had seen and weighed carefully their Memorial against it. Is India really to be governed in this way ? If the Bill is the wise and just measure which the outgoing Ministry declare it to be in their conviction, they might safely have left it to be confirmed by their successors. They know well how doubtful is the wisdom of the measure, and that their successors would never have passed it in its present shape, and Lord Kimberley's act ought to be disallowed, and the despatch recalled. His course reflects dishonour upon the late Ministry.

We trust very earnestly that Lord KIMBERLEY may be called to account for this conduct. He plainly signed the despatch for no reason whatever but to embarrass his successors, and if possible, to prevent their review of the Act. Englishmen are not used to such conduct on the part of their public men, and if Parliament is still sitting when the Mail arrives, his lordship will, we trust, be called to account for his course.

Miscellaneous Items

WE regret to learn that the tobacco crop at Henzadah has been greatly damaged by insects ; and that in consequence the out-turn will fall considerably short of what was expected.

THE Kyoto Exhibition was closed on the 8th July with the usual formalities, and medals, &c., were presented to the successful exhibitors by the Governor who was in attendance with a number of the local officials. It was mentioned that 187,571 articles had been shown by 1,031 exhibitors, and that 54,481 persons had visited the building since it was opened on the 1st of last April.

THE net income from manufactures in the Mercara Jail for the past year has fallen off. This is attributed to the opposition bakeries now started outside by private speculators. Twenty-two convicts work daily at the bakery, and the grinding of the wheat is said to be work of a good penal kind, and provides hard labor for many long-sentenced prisoners, who cannot be sent to work outside. The Jail authorities, however, are willing to discontinue bread-making altogether, if a good reliable baker were to set up business.

THE ground-nut season at Pondicherry is nearly over ; arrivals by rail and road are now very light, and consist for the most part of old stocks upon which advances have been made. Four vessels have lately left for Marseilles with 126,094 bags and pockets ; viz., the *Sir Garnet Wolseley*, 25,384 ; *Toledo*, 5,155; the *Naples*, 27,554; and the *Leban*, 28,004. Prices are nominally from Rs. 21-8-0 per French candy of lbs. 528 English,—but the whole crop has been bought up. Up to date about 375,000 bags have been shipped, and the stocks on hand amount to some 100,000 bags more, so that our original estimate of February last, viz., of from 450,000 to 500,000, will be substantially correct. The *Saint Fazaire* is now completing her loading, and will leave in a few days for Marseilles.

A TABULAR statement has been issued by the Director-General of Railways showing the position of the Indian lines constructed and in progress on the 31st of March last. The guaranteed railways had on that date 109 miles in progress and 47 miles not commenced ; the assisted railways had 758 miles in progress and 40 not commenced ; the State Railways Imperial 1,163 and 427 ; and the State Railways Provincial 420 and 109. The figures for the State Railways of Native States are 438 and 33 respectively, while the East Indian had 9 miles in progress. This gives a grand total of 2,897 miles in progress and 256 not commenced. The Bolan Railway and its extension to Quetta, with the Shebo-Khojak extension, are not included in the above return, as they were not at that time sanctioned.

A SERIOUS blow has been aimed at the indigo industry from a friendly quarter. We learn on good authority, that "for the benefit of goods manufactured in Persia, H. M. the Shah, in 1882, issued a decree interdicting the importation into, and the sale of aniline dyes within, his territories. Information has now been received by the Government of India, that H. M. has recently placed a similar restriction on the importation into Persia of thread coloured with such dyes." The trade returns show no importation of aniline dyes to Persia during late years, until last year, when 11 cwt., valued at Rs. 1,350, were apparently surreptitiously sent to Khorasan. It is difficult to arrive at the real extent of the trade in threads and yarns, but this also appears to have been on the same scale. It would seem, therefore, as if the Shah was a protectionist of very extreme views. The total export of indigo dyes from British India is valued at Rs. 6,22,260.

THE following is an order passed by the Dewan to his Highness the Maharaja of Mysore :—The Deputy Commissioner of Bangalore reports that the drain upon the fuel resources of the Bangalore District is becoming heavy, and that the reckless felling of fuel in the district forests of that district requires some check. As economy in this respect is now of vital importance, owing to the large supply of fuel which is required by the State Railway, and for the increasing requirements of the city and station of Bangalore, he proposes the levy of a seigniorage upon all fuel felled in Government district forests and brought into Bangalore, and has recommended the following rates of seigniorages : Four annas per vadder cartload of fuel, 6 annas for country cartload of fuel, Re. 1 and Re. 1-8 per cartload of charcoal. These rates have been in force since 1870 in a portion of the Bangalore district, viz., in the Masalavadi forest, in the Kankaupalli Taluk. The levy of the proposed seigniorage has been sanctioned by the Dewan.

FROM a report of Irrigation Works in Sindh for 1883-84, we find that the capital expenditure during this year, 1883-84, from productive and ordinary funds, amounted to Rs 4,42,032 and Rs. 39,586, respectively. The total capital outlay up to the close of this year was Rs. 1,01,13,681, of which sum Rs. 67,74,709 had been spent on productive Public Works. The gross revenue from all sources was by assessments Rs. 28,66,726 and by collections Rs. 2,80,561. The revenue due to irrigation works other than agricultural was by assessments, Rs. 28,66,186 and by collections, Rs. 25,06,517, against this the maintenance charge, direct and indirect, and including the charges for collection, amounted to Rs. 14,58,228. The net revenue, calculated on the earnings of the year was therefore Rs. 14,07,950. It would, however, appear from paragraph 12 of the Superintending Engineer's report, and from paragraph 4 of the Commissioner's memorandum, that some claims or remission were still unsettled at the close of the year, and that deductions from the canal share of the consolidated revenue to the amount of about Rs. 60,000, will have to be made in the accounts for 1884-85.

THE Poona Horse Show will be opened on Wednesday, 7th October, and will remain open the following day. His Excellency the Governor has given his patronage to the Exhibition, H. E. the Commander-in-Chief is vice-patron, there is an influential list of stewards, and Major S. Babington is joint secretary. The Collector of Poona, who will be glad to receive subscriptions to the prize fund, acts *ex-officio* in a similar capacity. To the fancy classes Rs. [illegible]500 has been allotted as prize money, but this is conditional on the public subscriptions being made on a sufficiently liberal scale, otherwise a proportionate deduction will be made from the awards. No entrance fee is charged in the *bona fide* breeders' classes, and exhibitors are treated very liberally, Rs. 4,335 being divided as prizes throughout the various classes in this department. This sum is provided by the Government grant-in-aid and by special contributions from the public towards the improvement of country-breds. The conditions have been carefully framed, and discretion is given to the joint secretaries to pay batta to exhibitors, to grant free railway passes for animals, and to remit entrance fees in the cases of poor exhibitors. Concessions for the carriage of horses to and from the show have been obtained form the G. I. P. and B., B. & C. I. Railway Companies.

Selections.

REPORT ON EXPERIMENTS AT ALON.

From E. Romanis, Esq., Chemical Examiner, British Burma,* to the Director of Agriculture, British Burma,—dated the 29th May 1885.

I HAVE the honour to forward herewith my report on the Alon farm. It is much shorter than last year's, as there is only six months' work to be recorded.

It has been delayed by my absence examining minerals in Tenasserim.

The agricultural experiments at Alon were discontinued at the end of January, but resumed in September 1884. It was then too late to attempt anything with sugarcane, but rice-planting was still going on, and seven plots were planted with rice purchased from natives. Of these, two were unmanured as in 1883; one received twice the quantity of nitre it did the previous year.

The plot manured with bone-dust in 1883 was divided; one-half received bone dust at the rate of 10 cwt. per acre, the other had no addition.

The plot manured in 1883 with dissolved bones was similarly divided; one-half was left, the other had night-conservancy carts emptied on it at the rate of 120 per acre.

There was a drought in October, which appeared to injure those plots most which were a little higher than the others. The effect of a slight difference of level was very obvious. This cause of error must be eliminated by making plots of the same manure at each level and taking the average.

The dissolved bone plot gave the best result; the addition of the conservancy manure made no difference. The two plots with ground bones came next, but the extra supply did not produce a proportionate increase in the crop.

The nitrate of potash this year gave a lower result than the unmanured, whilst last year it was almost equal to the dissolved bones. Probably the soil was exhausted by last year's crop. The unmanured gave practically the same result as last year. The results are tabulated below:—

	1884.		1883.*	
	Grain.	Straw.	Grain.	Straw.
Ia.—Dissolved bones (laid on in 1883)	2,420	2,415	2,165	2,785
Ib.—Dissolved bones plus conservancy manure	2,420	2,500	...	...
IIa.—Bone-dust, 5 cwt. in 1883 ...	1,916	2,342	2,291	2,869
IIb.—Bone-dust, 5 cwt. in 1883 and 10 cwt. in 1884	2,136	1,960	...	...
III.—Nitrate of potash, 110lbs. in 1883 plus 220lbs. in 1884 ...	1,149	1,124	2,040	2,160
IV.—Unmanured	1,392	1,653	2,055	2,535
V.—Unmanured	1,282	1,930	1,300	1,565

It will be seen that there has been a decrease in every plot but *Ia* and *Ib*, where there is an increase of 250lbs. per acre. The conservancy manure was put on B, but it is most likely that it was washed over into A by the overflow of the water.

I intend this year to try the effect of lime on the soil.

II.—SUGARCANE.

There were six plots planted with sugarcane in December 1884. The manures were bone-dust and nitrate of potash, bone-dust and chloride of potassium, dissolved bones and chloride of potassium, dissolved bones and nitrate of potash, and dissolved bone and nitrate of potash after lime. The last so far looks the best. The chloride of potassium, proposed as a cheap substitute for nitrate, appears injurious, probably because of the common salt which it contains.

JUTE.

The jute planted in 1883 at Alon failed because of the wetness of the soil. In 1884 the experiment was repeated in a drier situation. The manures used were nitrate of soda and nitrate of potash. There was no difference in the result. The jute attained a height of 5 to 6 feet, when it flowered; very little of it was fit for making fibre. I infer from the experiment that the soil is deficient in lime.

SORGHUM.

After the jute was cut, the ground was prepared for sorghum. There were five plots,—two unmanured, one had nitrate of potash alone, one dissolved bones alone, and the last a mixture of nitrate of potash and dissolved bones.

The proportions were—

I.—Unmanured.			
II.—Nitrate of potash	...	195	lbs. per acre.
III.—Dissolved bones	...	1,326	
IV.—Dissolved bones	...	1,326	
Nitrate of potash	...	195	
V.—Unmanured.			

I could get no information as to the best time for sowing. Sorghum is said to ripen in four months, and to require cold weather to produce the largest quantity of sugar. I, therefore, planted in October. I am now inclined to think that the middle of August would be a better time.

I had canes cut from time to time, the juice expressed, and the sugar determined by the optical method. The results are somewhat irregular, as the growth of the canes was unequal, but on the whole they appear to show that the maximum of sugar was about the end of December.

CRYSTALLIZABLE SUGAR.

	25th November.	27th November.	6th December.	10th December.	16th December.	16th December.
I.—Unmanured ...	...	...	...	...	8·20	...
II.—Nitre	...	...	...	3·96	...	...
III.—Dissolved bones ...	...	2 0	...	9·82	...	...
IV.—Dissolved bones and nitre.	5·16	...	4·50	...	Yellow 6·62	Purple 14 2
V.—Unmanured ...	...	...	...	...	...	...

	8th January.	9th January.	10th January.	12th January.	13th January.	14th January.	14th January.
I.—Unmanured ...	...	...	...	5·40	...	...	...
II.—Nitre	...	...	7·29	...	...	...	...
III.—Dissolved bones ...	...	...	...	...	8·65	10·33	...
IV.—Dissolved bones and nitre.	...	12·30	...	...	8·62	7·98	11·18a
V.—Unmanured ...	...	...	...	...	...	...	...

(a) Taken from the mixed juice of the whole plot.

Nos. III and IV were nearly equal, No. IV slightly the better. The canes were from six to eight feet high; on No. II they were from three to five feet; on Nos. I and V the crop utterly failed.

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* I must here note that the column headed "straw" in last year's report on the Alon farm, paragraph 44, should read "straw and grain," and the column headed "total" deleted.

The juice contained about 17 per cent of solid matter, of which only half was crystallizable sugar. As the other solids prevent the crystallization of cane sugar, the juice when evaporated gave a dark treacle of a bitter taste.

I do not think that sorghum is suited to Burmah. It is not so rich in sugar as sugarcane, and the manufacture of sugar from it requires far more skill. It is true that it occupies the ground for only four months, but it is the same time as rice, and there appears to be no advantage in replacing rice by sorghum. The cultivation of sorghum in the United States is the result of protective duties. There it has taken the place of maple sugar. But under natural conditions, I do not think it could compete with sugarcane. It seems unnecessary to make any further experiments with sorghum.

Expenses and Receipts.

The farm has been enclosed with a wire fence, and a well for irrigation dug, at a total cost of Rs. 1,200. The working expenses were Rs. 292-11-0. The rice sold for Rs. 27-6-0. The sugarcane cannot be cut until November.

NITROGENOUS MANURES.

By Dr. A. P. Aitken,

Chemist to the Highland and Agricultural Society.

The most powerful and by far the most important nitrogenous manures are nitrate of soda and sulphate of ammonia. The former is found as a natural incrustation of the soil in Chili, Peru, and Bolivia, and forms a great source of wealth to these countries. It is purified and exported in enormous quantities to Europe and other countries. The exports have for some years averaged about half-a-million tons per annum, and about one-fifth part of it has been imported into Great Britain. Sulphate of ammonia, which has for many years been saved as a bye-product in the manufacture of coal gas, is now being saved in other industries which have for years allowed it to go to waste. Paraffin oil works have been recently supplying the markets with it, and it is probable that in a few years the supply from that source, and from steel works and other industries where coal and shale are being distilled, will become so great as to render us comparatively independent of the foreign supply of nitrate of soda.

These two substances are supplied to farmers in a remarkably pure state. *It is seldom that the impurity, or the refraction as it is called, exceeds 5 per cent.* They are valuable as manures on account of their nitrogen, and the amount of nitrogen they contain is usually expressed in its equivalent of ammonia; or, in other words, these substances are valued according to the amount of ammonia they are able to yield. Roughly speaking, good nitrate of soda can yield one-fifth of its weight of ammonia, and good sulphate of ammonia yields one-fourth of its weight of ammonia. The latter is, therefore, the more concentrated form of nitrogenous manure, for 4 cwts. of it are equal to 5 cwts. of nitrate of soda.

In making use of these substances as manure, we have to consider other circumstances besides their concentration. We have to consider their relative activity, that is to say, the rapidity with which the roots of a crop are able to absorb them. It is a matter of common experience that nitrate of soda is the more rapidly-acting form of manure, so that its want of concentration is compensated by its activity. The cause of this greater activity has during the last few years been investigated by various chemists with remarkable success. It has been found that sulphate of ammonia and other ammonia salts are converted into nitrates in the soil by means of a minute living organism, which has been called the nitrifying germ, or ferment. This organism has already been referred to as existing in all fertile soils, and as capable of converting the nitrogen of various kinds of nitrogenous matter into nitric acid, which, combining with lime or some other salifyable base, forms nitrates for the nourishment of plants. When nitrate of soda is supplied to the soil it is already in a form in which the roots of plants are able to absorb it; but when sulphate of ammonia is applied, it has to be converted into a nitrate by means of the nitrifying germ before it is in a form suitable for absorption by the roots of plants. The speed with which this conversion goes on depends on the abundance and activity of the nitrifying germs, and that has been shown by Mr. Warington, of Rothamsted, to depend on various conditions, such as warmth, aeration, and the presence of lime or other suitable base.

The relative activity of these two forms of manure determine to some extent the use to which they are to be applied. When an immediate increase of growth is wanted, the nitrate is the better manure, but in order to attain that result the roots of the crops must be there to absorb it. Both of these salts are very soluble but the nitrate is the more soluble of the two, and it is the one which is least able to be retained by the soil; so that if the roots are not already well established, there is certain to be a loss of nitrate, especially during wet weather, for it passes down through the soil and into the drains, unless the roots of plants are there to retain it and carry it up to assist in the growth of the crop. It is evident, therefore, that the best way to apply nitrate is as a top-dressing on a young crop whose roots are established, and that the crop which is able to make the best use of nitrate is one whose roots are most abundant. It is on this account that even a slight dressing of nitrate produces so marked an effect upon a grass crop; and, on the other hand, it is to this peculiarity of nitrate of soda that we must ascribe the failure which frequently attends its application to the root crop fallow, especially during wet seasons. During a dry season nitrate of soda is a most efficacious manure, and when applied along with the seed of the turnip crop may have the effect of saving the crop by accelerating the growth and carrying it beyond the reach of the turnip fly, and in such seasons its use is to be recommended for such a purpose; but unless some other more slowly-acting kind of nitrogenous manure is applied along with it, there will be a deficiency of growth during the latter part of the season. For the benefit of the crop, as the season advances, sulphate of ammonia is the preferable form of manure, and it is to be preferred on other grounds as a component of a turnip manure. Where dissolved phosphates—and especially superphosphates—are used as the basis of a manure for a root crop, sulphate of ammonia may be mixed with it, but not nitrate of soda, for it is decomposed by the acid present in the mixture, and the products formed may be productive of injury instead of benefit to the crop.

Generally speaking, the relative utility of these two powerful nitrogenous manures may be described thus—sulphate of ammonia may form a most effective part of a mixture which is applied with the seed, while nitrate of soda is most efficaciously and economically applied as a top dressing. Sulphate of ammonia may also be applied with good effect as a top dressing to root crops, but when so applied to cereals it has the effect of prolonging the growth during the latter part of the season, and thus retarding the time of ripening. Both have a very marked effect on the growth of cereals, but they tend to increase the straw more than the grain. Applied to grass or pasture, they greatly increase the leaf, and encourage the growth of true grasses, but diminish the amount of clover. Ammonia salts, especially when applied to meadow in large quantity, as shown by the Rothamsted experiments, extirpate clover and leguminous plants. Nitrate of soda does so to a less extent, and upon the whole it has a more beneficial action as a manure than sulphate of ammonia, not only on the crop, but also on the texture of the soil, and especially of the sub-soil.

These manures are sometimes called *stimulants*, but that is not a correct name to apply to them. The word stimulant is properly used to describe a substance which produces a growth to which it does not substantially contribute, but that cannot be said of nitrate of soda and sulphate of ammonia, both of which contain an essential element of plant food. When used alone they exhaust the land more rapidly than when no manure is applied, for nitrogen is the manurial substance which is usually most needed in soils, and, by applying it, the soil is caused to yield up its mineral constituents more rapidly. When their inordinate use is persevered in, the crop rapidly diminishes to an unprofitable limit, involving a double mischief—the impoverishment of the tenant, and also of the land. On that account these substances should either be used on land in good condition, or an adequate amount of phosphatic and potassic manures should be applied along with them.—*North British Agriculturist.*

NOTES ON ECONOMIC PLANTS.

[*Report on the Royal Botanic Gardens, Ceylon,* 1884.]

Cinchona.—The year has been characterized especially by an immense export of bark—more than ten million (10,139,953) lbs. This, which is considerably more than three millions over that of the previous year, is in excess of all anticipations. As a result the price of Quinine has continuously fallen to its present price of 4*s.* to 4*s.* 6*d.* per oz., and of bark to 5½*d.* or 6*d.* per unit of Quinine. Yet the value of the bark exported in the year 1883-84 is estimated at over 4½ million rupees—more than three times that of the tea exported in the same period, and the cultivation in Ceylon is still very remunerative to the growers of good barks. The fall in value has, on the other hand, been disastrous to the South American bark trade, and the export from that part of the world has been greatly reduced. The lowering of the price of Quinine must be regarded as a great benefit to humanity, and is indeed the very object which the originators of cinchona cultivation in the East set before themselves.

A little more seed of "Cuprea Bark" (*Remijia*, sp.) was received from Kew in July. Mr. Nock reports that all failed to germinate except about 200, which were sown in a pan placed in rather strong bottom heat. Of these, unfortunately nearly all were eaten off in one night, and at the close of the year only two or three tiny unhealthy plants remained.

A good series of cinchona barks was exhibited by the Planters' Association at the Calcutta Exhibition. At the request of Mr. Capper, the Commissioner, I drew up for his "Handbook to the Ceylon Court" a succinct account of the history and position of cinchona cultivation in Ceylon.

By the courtesy of Mr. J. V. H. Owen, I have had the opportunity of examining his plantation of "Verde" and "Morada" cinchonas in new Maturata. The oldest of these trees are now 2½ years, and commencing to flower. They present a considerable range of variety, though less than when seedlings, and generally maintain their robust character. The large proportion belong to a type which is distinct from any I have seen here hitherto. It is, however, I consider, a variety of *C. Calisaya* and not of *C. Ledgeriana*, and is best characterized by the foliage. The remarkably intense coppery or vinous colouring of the under-surface of the leaves, so striking in the young plants, usually disappears gradually in the older ones, but it as conspicuous as ever in young shoots sent up from their base. The leaves of the flowering trees are remarkably broad for *Calisaya*, rather obtusely pointed, quite smooth, firm, and with very large scrobiculæ. The flowers vary greatly in size and colour as in other *Calisaya* forms. No analysis of the bark has as yet been made; the varieties of *C. Calisaya* hitherto grown in Southern India and Ceylon have not proved satisfactory as Quinine bearers, it remains to be seen if this will be an exception.—[*Note added*, March, 1885.]

Cacao.—The growing importance of this cultivation to the colony is seen by the large increase in its export, 9,863 cwt. in 1883-4 against 3,588 cwt. the year before. The position is very encouraging on the whole.

The varieties received in 1881 from Trinidad having now for the most part fruited, I have been able to look into the characters and differences they present. The whole of them produce seeds which are more or less dark violet-coloured on section when fully ripe, and thus differ completely from the variety in general cultivation here, which has the seeds pale yellow within. As regards the names under which they were received, and which have been very carefully kept attached to the plants from the beginning, they do not appear to connote any very constant or distinct characteristics or differences, so far as these examples allow me to judge.

The names of the strains, as sent by Mr. Prestoe with the plants, were as follows:—

Forastero (numbered 8 & 13),
Cundeamar (numbered 10, 14, 16),
Cayenne (numbered 15 & 18),
Verdilico (numbered 12),
Sangre Toro (numbered 5),
Criollo or *Cokro* (numbered 9 & 17),

and, in addition, a number labelled "Forastero, several best selected varieties mixed." Most of these might apparently come under some of the other names, and indicate that the name "Forastero" is used also in an extended sense to include them.

The variety in shape, size, and colour of pod, and number, weight, and form of seed is remarkable; and as I have had careful coloured drawings made of each sort as they ripened, they can be readily compared with one another and with descriptions. Among them are some undoubtedly very fine sorts; and some others as characteristically bad, with small round pods, with very thick walls and few seeds. The worst I shall destroy, lest they should injuriously affect the others by cross-fertilization.

Forastero (No. 8), Sangre Toro (No. 5), and Criollo (No. 9), have not yet produced ripe pods, but of the remainder the most desirable sort as judged of by number, weight, and character of seeds appears to be the Cundeamar (No. 10). The pods of this variety, of which we have six trees, have all been deep-red, usually somewhat pointed, with the 10 grooves rather deeply marked, and, as the name indicates, the rind somewhat nodular or worted; the seeds are long and almond-like and show on section a broad-oval, that is, they are but slightly compressed. Among the other Cundeamars (Nos. 14 and 16), is a considerable range of variety, some are yellow-podded, and of these one tree of No. 16 appears to be a specially fine sort.

I had looked forward to the fruiting of the *Criollo* variety, expecting it to exhibit characteristic differences from all the other kinds. The two trees of No. 17 have, however, produced pods and seed which it would not be possible to distinguish from some of the Cundeamars. The Cacao properly called Criollo (or Creole) is said to be distinguishable by its smaller pods (which are red), and especially by its almost globular seeds, the interior of which is a "pale crimson," and which have a particularly fine flavour. The plants sent here under the name do not exhibit these peculiarities. This was formerly the only kind grown in Trinidad (h[illegible] "Criollo"—native), but was destroyed there, and is now principally cultivated in Venezuela, where it affords the well-known Caracas Cacao of commerce. In Trinidad its place has been taken by the Forastero (=foreign) varieties. As to which of these two classes the old "Ceylon" Cacao is to be referred; if to either of them, I am unable to say. It is believed to have been received about 50 years ago from Trinidad,* and may have become somewhat modified since its introduction.

I have made a small distribution of the pods and young plants of the varieties of these Trinidad Cacaos to such planters as were desirous of trying them, about 30 in number. The small number of the trees of course rendered anything more extensive impossible at present.

The endeavour to spread Cacao cultivation among the villagers in suitable districts has been carried on, and during the year, 3,500 pods (about 10,500 seeds) and 1,100 young plants have been sent out from Heneratgoda for distribution by the Government Agents through the headmen. I drew up in May some simple instructions for cultivation, which were printed in the vernacular as well as in English, and given out with the plants and seeds.

In my last Report, I called attention to the damage done on a few estates to the young shoots of Cacao by the punctures of a sucking bug, *Helopeltis Antonii*, and expressed the hope that it would not spread widely. At the time I was not aware that this insect was a native of the island as seems to be the case,† but I am glad to be able to report that it does not appear to be generally distributed here, and shows a tendency to restrict itself to particular localities. In a few neighbouring places towards the end of June (after a long drought), the condition of the Cacao was so serious that I was requested to visit and report officially on the cause. This I did and satisfied myself that, as had been suspected by me, this insect was the principal source of the injury. In a report submitted in September,‡ I was able to some extent to trace out the life-history of *Helopeltis*, and the nature of the damage done both to the shoots and the young pods. The eggs are, without doubt, laid in the young succulent shoots; whether also in the young pods is not certainly determined; in all stages the insect is active, and lives by sucking the tender young tissues of the plant. I recommended systematic catching and destruction of the larvæ and perfect insects as the best method of dealing with the pest, and where this was thoroughly carried out the good effects were quite evident. The insect is not, as compared with some pests, very abundant, but over 2,000 a day were being caught on one estate during the wet weather of October, when the Cacao was shooting up vigorously and a single bug commits much damage. The effects of the drain on the fluids of the trees are much more serious where Cacao is also exposed to the drying effects of sun and wind.

India-Rubber Ceara.—I have nothing further of a practical nature to report as to any method of collecting the Ceara-rubber at a cost sufficiently low to make it profitable to the European planter. It is, however, clear, that as the trees attain a larger size and greater age, there is a more copious flow of milk, and the tears of rubber obtained by leaving it to dry on the trees are larger and more solid. One of the original trees in Peradeniya, nearly 8 years old and about 14 inches in diameter has lately been cut down in making a new path; this tree had been thoroughly drained of milk in 1882, but on now repeating the operation, nearly 1½lb. of dry rubber was obtained.

A considerable distribution of seed (10,300) has been made to the Government Agents for experimental native cultivation. The tree will bear a dry climate and does well at Anuradhapoora.

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* Cacao was grown in the Botanic Garden (then at Kalutara) in 1819, and may have been introduced by Moon, the Superintendent. But the origin of most of the present cultivated cacao seems to have been a consignment from Trinidad obtained by Sir R. Horton in 1834-5.

† In the original description of the insect by Dr. Signoret published at the end of 1858, the locality given is simply "Ceylon." The author received the specimens from Dr. Anton Dohrn to whom he dedicated the species.

‡ Printed in the *Tropical Agriculturist* for October, 1884, Vol. IV. pp. 327—329.

Castilloa Rubber.—On application from the Superintendent of the Model farm at Kalutara I supplied 300 large seedling plants to that institution, and I am glad to learn that they are growing well, and have proved vigorous young plants.

The Government of Madras being desirous of continuing the experimental culture of this at Nilambur, a further consignment of 3 Ward cases containing 190 young plants was sent to Messrs. Hinde & Co. in March and July.

The measurement of the largest tree, 43 feet high, of the species at Heneratgoda is 32½ inches in circumference at a yard from the ground.

Ceara Rubber.—A good crop of seeds was produced at Heneratgoda, and over 1,000 seedlings were raised; most of these were distributed to officials in suitable parts of the colony. A few seeds were also produced for the first timeat Peradeniya in August.

In March, a case of 26 plants was sent to Calicut for the Madras Government. A box of seeds sent in July appears to have not reached its destination.

Our largest tree of *Hevea brasiliensis* is now 63 feet high and 36 inches in circumference at a yard from the ground.

Hevea Spruceana has not succeeded so well as its more important congener. The only two plants remaining at Heneratgoda are not in good health.

Other Rubber-yielding Species—*Tabernæmontana crassa* has grown up to 8½ feet high with very handsome leaves 15 by 9½ inches; a striking plant of *Landolphia Kirkii* is in flower all through the year, but has produced no fruit; its main stem is nearly 6 inches in circumference. *Urceola esculenta* from Burmah (see Report for 1882, p. 13) has become an unmanageable climber of large size, growing rapidly and spreading widely. The leaves on the older branches are now quite smooth; it flowers very freely, and has formed abundance of ripe fruit. It is difficult to understand how these can be edible as is said to be the case.

Nine plants of the "Talaing Milk Creeper," of Burmah, have been received from Col. Seaton, of the Indian Forest Department, and a few more from the Calcutta Botanic Gardens. This is *Parameria glandulifera*, another apocynaceous rubber-yielding vine Attention was first called to it by Dr. Pierre, late Director of the Sargon Botanic Garden. He introduced it from the forest into that garden in 1874, but it grows throughout the Malay Peninsula.* The rubber which is said to be of very superior quality is prepared by heating with water. The plant is found from sea-level up to 3,000 feet; like other rubber-yielding climbers of this family, large forest trees are necessary to afford it a proper opportunity for growth, and thus they are all unsuitable for ordinary estate cultivation, but would be valuable as forest products.

Gutta Percha.—The young trees of Gutta Taban Putih continue their natural slow growth, the largest (at Peradeniya) is now 2 feet 10 inches high. From the dried specimens sent by Mr. Wray from Perak, I was not able to determine this species of *Dichopsis*; but Mr. Thiselton Dyer *now informs me that it is, he believes, identical with Palaquium (=Dichopsis pustulatum)*, Pierre. The determinations of the other Perak species of "Gutta" given in my Report for last year (p. 14) are further corroborated by Mr. Dyer, who has been carefully examining the series of Mr. Wray's plants sent to Kew.

Gutta Sundek (*Payena Leerii*) has made good growth this year, some of the young trees being now 12 feet high.

I am indebted to Kew for plants of the tree affording the peculiar variety of Gutta Percha known as Gum Balata. This is *Mimusops globosa*, and a native of Guiana, Trinidad, and some of the West Indian islands. It is a large tree occurring under two forms (species), and its product appears likely to become of increasing use in various ways.

Erythroxylon Coca.—At the close of the year, a renewal of interest in "Coca," the well-known masticatory of Peru and Bolivia, has been caused by the discovery of a valuable property in the alkaloid contained in the leaves. Cocaine is now found to be a very effective and manageable local anæsthetic, and thus of great use in operations on the eye, throat, &c. Hence has sprung up a considerable demand for it in Europe and enquiries as to the plant and its suitability for culture in Ceylon. *E. Coca* has been grown in the Gardens for several years having been introduced through Kew in 1870. Growing as it does here in a hot climate and mostly in shade, it forms straggling bushes reaching 12 feet or more in height with long weak branches. Cultivated in the open and subjected to periodical plucking of its leaves, it would doubtless soon put on a much more compact habit. It blossoms profusely several times a year, the multitudes of small yellow faintly scented flowers completely covering the long branches; but not much seed is produced, most of the flowers failing to set. The fruit is scarlet, small, and one seeded; the plant can be also readily grown from cuttings. The Coca grows well at Heneratgoda, but at Hakgala an attempt made two years ago did not prove successful; a new trial is being made there: as the plant is in South America cultivated up to 5,000 feet or higher, it may be expected to grow well in our hill districts up to at least that elevation.

In the preparation of the leaf all that is needed is gradual but thorough drying, and the careful avoidance of any dampness or incipient fermentation. When finished, the leaves should be flat, thin, and brittle, and of an uniform pale yellowish-green.

I may add that we have in Ceylon a closely allied species, *E. monogynum*, which is common in the hot dry districts, and called in Tamil "Tevadaram." The wood is slightly fragrant, and Dr. Ondaatjie has recorded the preparation from it at Puttalam of a creosotic oil. The leaves are strikingly like those of *E. Coca*, and it is interesting to note that in South India, they were largely used as food by the poor during one of the late famines, as recorded by Dr. Bidie. They may possibly contain Cocaine.

Nux Vomica.—The export of these seeds from Indian ports, especially from Madras, has long been an important one, but I am not aware that any are sent from Ceylon. Yet *Strychnos Nux Vomica*, the "Goda kaduru" of the Sinhalese, is a common enough little tree in the drier parts of the Island. The seeds are the principal source of the very poisonous but valuable tonic alkaloids, strychnine and brucine. The publication of an interesting paper by Messrs. Dunstan and Short in the *Pharmaceutical Journal* (reprinted in *Tropical Agriculturist*, November, 1884,) calls attention to this as a Ceylon product, being based on a series of specimens sent from Hambantota by Dr. Ondaatjie, [illegible] Medical Officer of Galle. The researches of these chemists show that the Ceylon seeds are remarkable for their very high percentage of alkaloids, every specimen examined containing a much greater proportion than the richest known Indian examples. The bright orange fruit contains usually from two to four seeds, (but may have as many as nine), which are of different sizes in the same fruit; these investigations show that the larger the seeds, the greater the percentage of total alkaloids. *

Vegetables from Jamaica—Arracacha.—This umbelliferous plant, *Arracia esculenta*, a native probably of the Andes of South America, where it is cultivated up to 6,000 feet, was introduced into Jamaica in 1822, and produces large edible starchy roots with the flavour somewhat of parsnip. Two or three attempts to import the roots in a living state have proved completely unsuccessful, but Mr. Nock has now succeeded in raising some young plants from seeds sent from Jamaica, which it is hoped will in time develope the edible portion.

Cho-cho. (*Sechium edule*).—This is an excellent vegetable much in favour in Tropical America and the West Indies, and also grown in the Mediterranean region under the name of cayote or chayote The firm, fleshy, irregular fruit contains only a single large seed, and is thus very unlike other gourds. A case of plants of this, received from Kew in October, were all dead on arrival, but I have applied to Jamaica direct for seed. †

Tree, Tomato (*Cyphomandra betacea.*)—This is a close ally of the ordinary tomato, and a native of Peru and neighbouring countries, but cultivated in the hills in many parts of South America and the West Indies. Its fruit which is red and the size of a pigeon's egg may be employed in all ways like the tomato and resembles it in flavour. Seeds have been received from Jamaica, and there are now many young plants at Hakgala.

Socotra Dragon's-blood.—The source of this ancient drug and pigment was not known with certainty until Dr. Bayley Balfour's exploration of the Island of Socotra in 1880. He named the species of *Dracæna* which yields it, *D. Cinnabari*, Balf.f. A box of young plants of this interesting plant was sent to me from Kew in June. As the wet climate of this part of Ceylon would quickly prove fatal to them, they were sent to Anuradhapura where they will stand a better chance. But little of this ancient Cinnabar or *Dragon's*-blood at present comes into trade (through Bombay), most of the substance now so called being the produce of a rattan of the Malay region (*Calamus Draco*), and shipped from Singapore.

Tropical Fruit-trees.—It is worth mention, as a somewhat unusual event, that one of the Durian trees at Peradeniya gave a heavy crop of fruit last August. The tree is a young one, about 18 years old, and had not flowered before. The very large old tree which flowers so profusely every year also produced a few ripe fruit this year. Several other Malayan fruit trees also bore well, as the Mangosteen, Santol, &c. The "Chinese Quince," *Diospyros Ebenaster*, of the Philippines, also produced abundance of its handsome and sweet scented golden fruit which are however very poor in flavour.

Fifteen grafted mangos of approved varieties were received from the Poona Botanical Gardens and planted at Peradeniya.

There is a good supply of seedling Cherimoyer trees available at Hakgala. The fruit of this tree (*Anona Cherimolia*) is considered to be far superior to the other species of the genus *Anona* (the custard apple, sweet sops, &c.,) but the tree is adapted only to the hill climate of Ceylon.

Eucalyptus Plantation.—The trees are now nearly 2½ years old and grow well and rapidly. Of the 15 kinds selected for measurement last year, *E. Gunnii* is now the highest, 26 feet with a girth of 10 inches; *E. robusta* is 24 feet and 15 inches in girth, *E. marginata* 25 feet and 13 inches in girth, *E. longifolia* 24 feet and 14 inches in girth; these are the quickest in growth, at their present early stage, of the species we have.

Coco-de-mer.—In response to an application made in 1882, I have received from the Chief Civil Commissioner of the Seychelles, through his Excellency the Governor of Mauritius, 10 seeds of this rare and magnificent palm. They arrived in April and were at once planted—7 at Heneratgoda and 3 at Peradeniya. As yet there are no signs of germination, but the usual period occupied in this process is from 18 to 30 months, so that this is not to be expected. Peradeniya already possesses two beautiful specimens of this unique Palm, about 30 years old, but in the case of so extremely local a plant as this, and one of such peculiar interest to naturalists, it is much to be desired that a large stock should be in existence, so that in time it may be possible to propagate by seed from another centre. This palm, being, like the Palmyra, diœcious, it is necessary to have sufficient plants to make it probable that both sexes will be represented among them.

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* It has not been found in the Indian Peninsula or in Ceylon.

* The pulp in which the seeds are immersed contains a small proportion of Strychnine, so small that it is said that this pulp is eaten by birds. Dr. Ondaatjie has, however, settled by experiments on dogs, cats, and pigeons that it is fatally poisonous in sufficient quantity.

† A box of germinating seeds arrived in January 1885, and one of them has survived. From this there are now three rooted cuttings at Hakgala.

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THE
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A WEEKLY
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VOL. X.] CALCUTTA :—SATURDAY, AUGUST 15, 1885. [No. 3

Health, Crop and Weather Report.

[FOR THE WEEK ENDING AUGUST 5, 1885.]

General Remarks.—In the Madras Presidency all districts report rain, but more rain is wanted in Bellary, Ganjam, Coimbatore, and Tanjore. Prospects have improved in Bellary and Anantapore, and are generally fair, except in Madura, where they are unsatisfactory. In Mysore the rainfall was slight and insufficient for the young crops. Fodder is reported to be becoming scarce, and ploughing and sowing operations are retarded in places. In Tumkur and Kolar, prospects are uncertain ; and though they are moderately fair elsewhere, the harvest will depend on the future rainfall. In Coorg the season continues favourable.

General rain is reported from the Bombay Presidency, but more is wanted in parts of Karwar, Ahmednugger, Bijapore, Poona, and especially in Sholapore, Khandesh, and Nasik. The condition of the young crops is generally good, though in places they are reported to be slightly injured by blight and insects. Fodder is scarce in some districts. In the Berars, Hyderabad, the Central India and Rajpootana States rain has been general, and the crops promise well.

Little or no rain fell in the Punjab during the week under report. The *kharif* sowings have been nearly completed, and prospects are, on the whole, good ; but more rain is wanted. In the North-Western Provinces and Oudh good rain continues to fall, but a break would now be beneficial. Prospects are everywhere good. Wet weather continues in the Central Provinces, where a break is now wanted in some districts. *Rabi* sowings have commenced, and weeding and transplanting continue.

Rain has fallen throughout Bengal, and prospects are favourable everywhere. Transplanting is progressing favourably, but more rain would be beneficial in some parts. In Central and Eastern Bengal the *bhadoi* harvest is in progress, with prospects of a good average yield of early rice. Seasonable weather prevails in Assam, and agricultural prospects continue good.

In British Burmah ploughing, sowing, and transplanting continue.

The public health is generally fair in most provinces.

Prices are generally stationary, except in the Punjab, where they fluctuate with a tendency to rise. In Bengal the price of rice is still high.

Madras.—General prospects fair, improved in Bellary and Anantapore ; in Madura reported to be discouraging.

Bombay.—Rain throughout the presidency ; more wanted in parts of Karwar, Ahmednugger, Bijapore, Poona, and especially in Sholapore, Khandesh and Nasik. Young crops generally good, but slightly injured by blight and insects in parts of Bijapore, by insects in part of Upper Sind Frontier, and by floods in parts of Kurrachi ; fodder scarce in parts of Nasik, Ahmednugger, Sholapore, and Bijapore. Cholera in parts of sixteen, fever and cattle-disease in parts of seven, and small-pox in parts of four districts.

Bengal.—General rain in all districts, and agricultural prospects favourable ; transplanting is generally well forward, but in some parts more rain is wanted ; *bhadoi* harvest progresses in Central and Eastern Bengal, with prospect of a good average yield of early rice. Price of rice is still high. General health continues fair.

N.-W. Provinces and Oudh.—Rain fell generally throughout the provinces ; a break would be beneficial. Prospects everywhere good. Prices steady on the whole. Public health good ; cases of cholera reported from Gorruckpore, Allahabad, Ballia, and Agra.

Punjab.—Rain in the Delhi, Simla, and Shahpore districts. Sligh, cholera in the Lahore and Rawul Pindee districts ; elsewhere health is generally good. *Kharif* sowings nearly completed ; prospects on the whole good, but more rain is needed. Prices of food-grains fluctuating, with tendency to rise.

Central Provinces.—Weather cloudy and rainy : break wanted in some districts. Weeding and transplanting continue ; *rabi* sowings commencing. Cholera continues in Raipore and Jubbulpore. Prices steady.

British Burmah.—Cholera severe in one district, slight in five districts ; small-pox slight in one district, elsewhere public health good ; cattle-disease severe in two and slight in three districts, elsewhere health of cattle good. Ploughing, transplanting, and sowing progressing. Rains continual and heavy during the month of July.

Assam.—Weather hot : more rain wanted. Public health fair, though fever prevails in parts ; prospects of all crops good.

Mysore and Coorg.—Rain insufficient for the young crops, which are suffering in consequence ; fodder getting scarce ; ploughing and sowing operations retarded in parts ; prospects moderately fair, but dependent on future rainfall. Cholera prevalent in parts of Bangalore and Mysore district ; small-pox in Tumkur and cattle-disease in parts of Mysore ; public health otherwise fair. Prices show slight upward tendency.

Berar and Hyderabad.—*Rabi* sowings continue ; *kharif* crops prospering. Cholera prevails in the city and suburbs ; general health in talukas fair.

Central India States.—Health and prospects good. Prices steady.

Rajpootana.—Tanks and wells full. Crop prospects excellent. Health good. Prices falling.

Nepal.—Weather seasonable. Cholera decreasing in Khatmandu, worse in other places. Prospects fair.

Letters to the Editor.

ENGLISH PLOUGHING vs. DEEP HOEING.

TO THE EDITOR.

SIR,—I have found persons, not sufficiently acquainted with Indian agriculture, advocating deep ploughing and the use of English ploughs. They seem not to know that there is such an instrument as the *kodali*, which, when properly handled, stirs the soil deeper than the Marquis of Tweedale's subsoil ploughs. And so long as the holdings are small, there is not the slightest chance of the English plough displacing the antiquated native *kodali*. In some places this *kodali* may not be so used ; and the English plough may come into vogue there. As to the *tangal*, which, may be translated into English as a single-tyned grubber, it will always hold its superiority *for light ploughing*. In Bengal, Behar, and Orissa, paddy cultivation is the most important of all cultivations ; he must be a bold man to assert that it will be economical for English ploughs to displace the native *tangals* for paddy cultivation. A light grubber, something like Howard's three-tyned *Indian* cultivator, has a greater chance of success. But it is far too costly. A *tangal* costs about 12 annas, and a three-tyned cultivator should not cost more than two rupees. In agriculture, as in any other business, some succeed while others fail. They use the same *tangal*, *bindtog*, &c. The explanation is to be sought, not in the imperfection of the cultivating implements, but somewhere else. Should gentlemen with capital ever engage in agriculture, the agricultural condition must be changed. To a ryot it does not matter whether it takes him two days instead of one to plough a certain field. But to a person employing hired labour, it makes a serious difference. For a field of half an acre of sugar-cane, can an English plough beat a *kodali?* But if the field be 10 acres, it will be a saving of labour to use the imported article. But I have not seen the Bengali ryot or ryots who own a single field of 10 acres. If you have large fields and hired labour, you may use implements which are suited to such a condition. But the idea of using, in small farming, implements which are suitable for large farming, is simply absurd.

S. DATTA,
Settlement Officer, Mohurbhunj.

PRACTICAL EDUCATION FOR AGRICULTURAL SCHOLARS.

TO THE EDITOR.

SIR,—I beg to suggest that the period of education of the agricultural scholars should be extended to three years, and this additional year should be spent in Italy, Germany, or the United States, to study sericulture, the manufacture of tobacco and sugar, or the cultivation of cotton. Wheat, barley and oats, the cultivation of which is to be seen in England, are not much known in Bengal. Potato cultivation, as carried on by the despised ryots in the neighbourhood of Calcutta and on the Khasia and Garrow hills, cannot be improved upon. There is nothing of paddy cultivation to be learnt in England. So far as cultivation of crops goes, the education of agricultural scholars is more or less theoretical. If a student were to learn the manufacture of tobacco or sugar, as carried on in the States or Jamaica, or sericulture as carried on in Italy, or cotton cultivation in the Southern States, he would bring back to India information which would be really useful to him in guiding others. No amount of education in the Agricultural College can dispense with the acquirement of the elementary lessons in the manufacture of tea, tobacco, sugar, and silk. Next to paddy and cotton, these products hold the foremost place in India. It is, I think, a mistake to exclude a course of teaching in the manufacture of the articles just named, on the technical ground that manufacture is not agriculture. Just imagine the position of the manager of a tea garden who knew nothing about the manufacture of tea! Yet this is the position of our agricultural instructors. They attempt to teach us how to manufacture tea, tobacco and sugar, although they know very little about the matter practically.

S. DATTA,
Mohurbhunj.

Editorial Notes.

THE returns for June show a considerable falling off in the opium revenue. The total actual revenue, however, up to the end of June, was Rs. 2,03,46,500, or Rs. 6,900 better than the estimate. This is including the Bengal returns, which are upwards of three lakhs short of the estimate.

⁂

FROM the latest Mauritius papers we learn that not only will the sugar crop this season prove a short one, but that the outturn will be inferior to that of the last crop. This is said to be partly due to the long drought which was experienced at the beginning of the year, and now the cool season has commenced, and has checked the growth of the canes.

⁂

WE learn that a telegram has been received from Captain Plummer, Manager of the Mysore Gold Mining Company, giving the returns of the production of gold for the month of June, as follows:—"79 tons of rich quartz from the bottom of the mine produced 305 ounces of gold; 3 tons of quartz from the 173-feet level, 6 ounces; and 37 tons of blanket sands from previous stampings, 12 ounces: total, 119 tons yielded 313 ounces of gold."

⁂

Kuhlow's gives the following figures of the trade of Italy:—The trade of Italy has amounted as follows, during the first four months of 1885, in francs:—Value of goods imported, 506,732,100 (compared with 1884, an increase, 53,320,770); value of goods exported, 330,786,800 (—57,057,100); gold exports 76,718,800 (+73,259,200); gold imports, 2,554,400 (—3,965,000); silver, exports, 30,338,400 (+29,513,800); silver, imports, 17,525,200 (+11,627,800).

⁂

WE are informed that a Conservator of Forests in the Western Provinces considers it desirable to introduce the three varieties of the American tree, known botanically as *Prosopis pubescens, dulcis*, and *glandulosa* more extensively into the fuel plantations in the dry districts. We can state from experience that these trees grow best on dry, arid soil. They yield a hard, valuable timber. The trees are valuable in other respects as well; they bear abundantly a kind of sweet, succulent pod, which is largely used for cattle feeding. It is also ground into meal, which is sometimes resorted to as a substitute for flour by the famine-stricken in times of scarcity.

⁂

WE are informed that, at the suggestion of Mr. D. B. Allen, of the Bengal Agricultural Department, the Maharaja of Doomraon has consented to grant an area of ten acres of good medium land for the purposes of opening a small farm for instruction. The area will be divided into duplicate plots, one of which will be cultivated in the ordinary native way. A qualified man from the Cawnpore Farm is to be put in charge, who will cultivate the lands under instructions from Mr. Allen. The Maharaja has further agreed to supply the necessary labour and cattle, and to pay the superintendent a salary of Rs. 60 per mensem, as well as the other necessary charges.

⁂

THE Government of India in the Revenue and Agricultural Department have notified that information has been received from her Majesty's Secretary of State, to the effect that the Lords of the Treasury have assented to the proposal of the Government of India that the building in which the Colonial and Indian Exhibition of 1886 is to be held, shall be treated as a bonded warehouse. This concession has been made on condition that all packages coming from foreign countries, in which term India is apparently included, shall bear special labels, specimen copies of which are to be submitted to her Majesty's Customs. Arrangements have accordingly been made for the preparation in London of the necessary labels of which a supply will be sent to all Exhibition officers as soon as they are received.

⁂

IN another column will be found a letter from our esteemed correspondent, Mr. S. Datta, the Settlement Officer of Mohurbhunj, on "Practical Education for Agricultural Scholars." We quite agree in the views expressed by Mr. Datta, that it is of primary importance for our agricultural teachers to know something of the *manufacture* of such products as tea, sugar, and tobacco. We are aware that some of our agricultural officers have given their attention to this subject; and from the official reports occasionally furnished to us, we have seen that Directors and Assistant Directors of Agriculture have devoted some time to the investigation of the various methods of manufacture practised by the natives. Nevertheless, the subject is an important one, and there is much to be learnt. We direct attention to Mr. Datta's letter, particularly to the suggestion regarding the extended period of agricultural education in England, and how it should be utilized.

⁂

WE learn that the result of the investigation made by Mr. Walker, Commissioner of Lands, British North Borneo, in the gold field on the Segama River, appears to be very favourable. A party which consisted of six men only worked in the bed of the river, and in six days obtained from the scooped-up sand over 3 oz. of the precious metal, the largest find for one day for a single pan being 80 grs. Mr. Walker has ascertained that gold exists in payable quantity in the silt and sand of this river from the 60th to the 200th mile. The success of this exploration has naturally excited considerable interest in the Colony. The Sungei Bilang, a tributary of the Segama, which was formerly supposed to contain considerable quantities of gold in its bed, Mr. Walker has found to be a failure.

⁂

TRADE advertising has taken all sorts of shapes and forms, and innumerable are the expedients resorted to for the purpose of bringing wares to the notice of the public. The United States have been foremost in the startling and ingenious character of advertisements, but the Germans have, it appears, gone in for a most extensive business in this direction. It is stated by the *Precurseur* of Antwerp that two commercial associations of Berlin are preparing a travelling exhibition of samples of German manufactured goods. A number of vessels fitted out for the purpose, are to visit the most important ports of Southern Europe and of Africa. Exhibitors will have to pay 322f. per cubic metre, and the voyage will last from eight to twelve months.

⁂

BORERS sometimes do incalculable mischief to trees. One of our regular correspondents suggested a method for keeping these pests off, and as there were several of our correspondents anxious to know a remedy, we hope they have been benefited. The following recipe, taken from that practical journal, the *Farmers' Review*, will, we think, prove useful to many of our readers:—"Take a tight barrel and put in four or five gallons of soft soap, with as much hot water to thin it, then stir in a pint of carbolic acid, and let it stand over night, or longer, to combine. Now add twelve gallons of rain water and stir well; then apply to the base of the trees with a short broom or brush, taking pains to wet the inside of all crevices. It should be applied in the latter part of June in this climate, when the moths and beetles usually appear. The odour is so pungent and lasting, that no eggs will be deposited where it has been applied, and the effect will continue until after the insects have done flying. If the crude acid cannot be obtained, one-third the quantity of the pure will answer, but it is more expensive."

⁂

The following summary of the London Coffee market is taken from the *Produce Markets' Review*:—"A larger supply has been brought forward, but mostly of small, undesirable lots, and several second-hand parcels. The dull tone of the past few weeks has continued, and, except for a few fine parcels, prices are in consequence slightly lower. The public sales have chiefly consisted of East Indian and Central American sorts. For the pale descriptions of the former, quotations are generally in buyers' favour, but all coloury lots have sold well, while really fine bold kinds are slightly dearer. The fine lots of Mysore offered have also fetched higher rates. The advance in this description during the last few weeks has been considerable, but even now prices are much lower than they have been for some years. There is not much change in Plantation Ceylon; fine growths continue scarce and relatively dear. In Costa Rica only a small quantity has been offered, and values are unchanged. Brazil and other solely export descriptions are in very limited demand, and rather cheaper.

	Home Consumpt.		Exports.		Stock.	
	1885.	1884.	1885.	1884.	1885.	1884.
	tons.	tons.	tons.	tons.	tons.	tons.
For the week endg. July 4 ...	254	249	527	791	14,194	25,537
For the 27 weeks endg. July 4	7,709	7,501	15,061	21,453		

⁂

The following tea statistics are furnished by a home contemporary:—"Unlike all other kinds of produce, the stock of tea in the public warehouses in this country is exceptionally low, and the supply of red-leaf China tea threatens to be altogether exhausted before the arrival of any portion of the new crop; yet the price remains stationary. The red leaf is drunk in the south of England, including London, and it is said that no other suits the popular taste. The matter, therefore, is of importance. The stock of this kind at the end of June, 1882, was as much as 50,500,000 lbs.; at the end of last June it was 39,500,000 lbs.; but at the end of the current month it is estimated by Messrs. J. C. Sillar & Co., in the circular just issued, not to exceed 18,000,000 lb. From this the deliveries of July have to be deducted; for the Foochow market has only just opened. The opening is late. At this time last year 5,000,000 lbs. had been exported. Under these circumstances one would naturally expect a marked rise of price; but there is none, and the market is quite inanimate. It must be borne in mind, of course, that in anticipation of an increase in the tea duty, the withdrawals of all kinds of tea from bond were exceptionally large for some time before the Budget statement was made. The stock in warehouse, therefore, does not as accurately represent the available supply in the country, as it usually does. Still the smallness of that stock offers speculators extraordinary facilities for manipulating the market."

⁂

The prospects of the Bengal Indigo districts are not so good as they were. The heavy rain has checked the growth of the plant, which is small and stunted, and, owing to the lateness of the season, but little improvement can be expected. Owing to the rising of the rivers, some of the concerns have had to cut unripe plant. In Midhapore, the plant has also suffered much from the heavy rains. Manufacture is general everywhere, and the vat produce is fair. The accounts from Behar vary according to the quantity of rain that has fallen. In some concerns, where the rain has been heavy, the plant is still backward, and the season is fully three weeks later than usual. In other concerns, which have been favoured with some fine, sunshiny weather, the plant has much improved. It seems doubtful, however, whether the *khoonties* will be able to grow to any size this season. Manufacture, except in parts of Chumparan, has been everywere commenced; and though the *bigha* produce is bad, the vat produce is fair. The advices from the North-West are very unfavourable, the heavy rain and floods having caused serious damage to the sowings, and the prospects not being nearly so good as they were a fortnight ago.

⁂

The following figures regarding the debt of India may be of interest:—The total sum of all loans raised in India by the Indian Government, and outstanding on the 31st March last, was Rs. 93,18,36,600, and the yearly interest chargeable on the revenues of the country is Rs. 3,84,12,940, or a fraction below 1⅛ per cent all round. The debt of India raised in England, including debentures and annuities of all denominations, on the abovenamed date, was Rs. 78,15,99,930, and the annual interest thereon Rs. 4,30,72,490. Taken together, the debt of India, in India and England, on the 31st March last stood:—

	Principal.	Yearly Interest.
	Rs.	Rs.
England ...	78,15,99,930 ...	4,30,72,490
India ...	93,18,36,600 ...	3,84,12,940
Grand Total	1,71,34,36,520	8,14,85,430

⁂

The following is a summary of Messrs. William, James, and Henry Thompson's fortnightly circular of Indian Tea, dated London, Thursday evening, 16th July, 1885:—"There has been a fair business since the 2nd inst., the total sales comprising 10,400 packages, of which 2,600 were old season's; 2,600 second hand, and re-prints, and about 600 from Ceylon. Of New Crop about 4,500 packages have been offered, and these have only sold slowly, though for the good liquoring parcels there has been good competition—but all grades of undesirable quality, though of good appearance, are neglected, and lower quotations have ruled, especially for Broken Teas under 1*s.*, which in some instances show 2*d.* decline on prices paid for the first arrivals—in leafy kinds the drop ranges from ½*d.* to 1½*d.* per lb. These kinds closely follow the course of the China market, which has been rapidly forced down by frequent sales, 'without reserve.' New Season's Congous with clean liquor selling down to 7½*d.* per lb. The quality of latest arrivals does not yet show any great improvement, and many of the first invoices from various estates are still coming forward; but judging from musters received by the last two mails, later shipments from some districts should prove of excellent style and liquor. This should help consumption, as with an indifferent crop from China, good Indian Teas must be more freely used to maintain the retailers' standard of quality of previous years."

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At the instance of Mons. Natalis Rondot, of Lyons, the Chamber of Commerce of that place has decided to undertake a series of studies on the silk-producing worms of every country, on the cocoons of these worms, and on the silk which can be obtained from them, by reeling or spinning. The objects in view are—

(1) To determine, with the greatest possible precision, the general species and varieties of the domesticated, semi-domesticated, or wild worms.

(2) To ascertain the richness in silk of the cocoons, envelopes or silky coverings, the nature and quality of the silk obtained, and in particular the colour, fineness, tenacity, elasticity, yield of raw silk, and the aptitude for taking dyes, &c.

To have all the information possible on the subject, M. Rondot has addressed a letter to the Viceroy, asking his Excellency to help the Lyons Chamber of Commerce in this matter. The Revenue and Agricultural Department of the Government of India have issued a Circular to the several Local Governments and Administrations, requesting them to distribute copies of the papers to persons interested in the subject, especially to the non-official community. The Government of India do not, however, think it necessary to take up this matter officially for the Chamber of Commerce, but would be glad if the Chamber's enlightened action were brought to the notice of all persons interested in sericulture, and if they were invited to respond to the Chamber's request, as far as they conveniently can.

Mons. Rondot has forwarded, with his covering letter, a circular issued by the President of the Chamber of Commerce of [illegible]ons, which contains two series of questions, with explanatory notes, to be answered by intending helpers in this work. It may be added that the Chamber will be prepared to defray all expenses incurred in this connection by those undertaking he work of enlightenment. Elsewhere will be found the letter from Mons. Rondot, with its annexures.

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WE suspect that very few owners of cattle in India ever think of changing the food of their stock, or of the consequences that follow by not observing this precaution. The following note, which we take from the *North British Agriculturist*, will, we hope, prove useful in directing attention to this subject.—"Practical stockmen are generally aware of the importance of judgment and care in changing the food of animals. Such care is especially needful in spring and autumn, when the transition is made from hard, dry food to succulent green stuff, or *vice versa*. Potatoes form a valuable and safe article of diet so soon as animals become used to them; but when first used they require to be given with caution, and also when they are being superseded by other food. In East Lothian and other localities, potatoes, not saleable for human consumption, have this spring and summer been largely consumed by cattle. For this purpose they have been worth about 25*s.* per ton, or something less than half the price obtained for ordinary qualities disposed of earlier in the season in Edinburgh or other markets. Taking advantage of the drop in the price of stores, some farmers have bought in their cattle. Others have had their courts occupied with dealers' or butchers' beasts, and for two-year-olds have generally received about 8*s.* per week, furnishing potatoes, linseed cake and straw *ad libitum.* Thriving two-year-olds eat 4 lbs. to 5 lbs. linseed cake, costing at present £8 10*s.* to £9 per ton. Now that the potatoes are being finished up, it requires, during the transition to clover or vetches, judicious attention to prevent gastro-intestinal disturbance. Alike with horses and catt[illegible] and even when straw, cake, or corn are used, the change from, or to, a potato diet is liable to produce ind[illegible] tympanitis, and often diarrhœa. It is difficult to ex[illegible] cause of such disturbances. The special digestive [illegible] although gradually becoming suited for the effectiv[illegible] of food usually presented to them, probably d[illegible] not digest unwonted articles of diet. To prevent misc[illegible] keep either feeding or dairy cattle continuously [illegible]ri[illegible] potatoes should be used in steadily diminishing amount, [illegible] their place supplied with grass, cut, and allowed [illegible] a couple of days. It requires about a week, gradually [illegible] [illegible]ely to effect this change of diet."

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THE demand for Burmah cigars has been increasing year by year; and if the proposal recently made by Messrs. H. S. King & Co., of London, to have Indian Tobacco specially represented at the forthcoming Indian and Colonial Exhibition, is successfully carried out, a very material increase may be expected in the demand for these cigars. The note drawn up by Mr. Cabaniss, Assistant Director of Agriculture, British Burmah, on cigar-making in that province, has therefore made its appearance most opportunely, and we hope cigar manufacturers will take particular notice of it. Mr. Cabaniss personally inspected a number of cigar manufactories in Burmah, and also a large number of cigar makers working at their own houses. What seems to have struck him most was the unnecessary waste of good material, and the wide-spread habit of converting good material into bad. He tells us that the cigar makers generally purchase tobacco of two qualities: the first quality for the wrapper, which frequently costs Rs. 120 per 100 viss, and the second quality for fillers, or the inside of the cigar, at prices varying from Rs. 60 per 100 viss. If mixed qualities are purchased, at about Rs. 90 per 100 viss, in which case the sorting of leaves has to be done by the makers themselves. It is curious, as Mr. Cabaniss tells us, that the smoking, or second quality, is quite as good as the first, the large difference in price being entirely due to the leaf of the latter being larger and more suitable for making wrappers. It is not, however, stated whether the tobacco alluded to is that grown in British Burmah, or that imported from Bengal and Madras. It seems that there is a great deal of waste in cutting the wrappers, though the trimmings from these are often worked in as filling. We are told that a large quantity of the leaf is more or less damaged when made into cigars, by the use of an impure gum or paste for fastening the wrappers. This soon becomes sour, and the cigar becomes mouldy and unsaleable. This is a point which should be particularly noted by cigar manufacturers. Notwithstanding all this waste, the prices charged for the cigars, which are at present up to one rupee per 100, leave a large profit, but Mr. Cabaniss thinks that, by the introduction of a more careful system of working, such as that [illegible]mmended by him, the price could be reduced to eight annas a hundred.

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THE following summary of American crops is taken f[illegible]m an American contemporary:—"The winter wheat harvest has commenced in the more southern districts. There is nothing in the later reports from the entire winter wheat area to cause us to raise the estimates of the probable outcome of the crop, which were based upon our special wheat report, *viz.*, that at the best the winter wheat crop will not exceed 200 million bushels. Reports of the condition of the spring wheat continue quite favorable, [illegible]aking [illegible]to account the entire area. While in some localities its co[illegible]tion [illegible] [illegible]cellent, and in others poor, the averag[illegible] is good, a[illegible] with [illegible] [illegible]mag[illegible] between now and harvest, we shall harves[illegible] [illegible]hap[illegible] [illegible] million bushels. Other small grains are prom[illegible] [illegible] [illegible] [illegible]op will be one of the largest, if not the largest [illegible]er [illegible]ai[illegible]d in [illegible]is country. The area in the winter wheat States [illegible] [illegible] [illegible]arged from the ploughing up of ground sown [illegible] [illegible]eding [illegible] [illegible]ts. The outlook for corn at this time is [illegible]. The are[illegible] [illegible]unusually large, and though in many districts somewhat [illegible]e, [illegible] stand is fairly good and the plants healthy. Some localit[illegible] [illegible]ufering severely from the [illegible]ages in fields of the corn-root worm, [illegible]ut these are not so extensive as to very [illegible]erially affect the [illegible]al outcome of the crop. Other localities have suffered fr[illegible] [illegible]cessive rainfall, which has kept back [illegible]ork in the [illegible] [illegible] taking the whole country the conditions are fairly good. [illegible]y, taking the country at large, will, we think, be an average [illegible]op. Some meadows suffered from the severe freezing of last [illegible]inter, but the weather since spring opened has been favorable. Pastures continue good, and stock is doing finely upon grass. Potatoes and other root crops are doing well and promise average yields. Small fruits are abundant, but the tree fruits will only make partial crops. This is especially true of peaches which will be almost an entire failure in all northern peach-growing districts. Leaving out the winter wheat, the crop outlook is at this writing, taking the country at large, quite [illegible]avorable. With the 40 millions of bushels of wheat now [illegible] sight,' and probably [illegible] much more in farmers' hands, we are in no danger of a bread famine even with the short winter wheat crop, and are su[illegible] of better prices for what we shall have to spare, than could have been realized if we had grown a full crop this year."

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IN May last we noticed the revival by the Government of India of some previous orders regarding reports of falls of aerolites. It would seem that this revival has not been without some practical results. Mr. Medlicott, Superintendent of the Geological Survey of India, gives an interesting account of two meteoric falls recently brought to notice, and which are now safely deposited in the Indian Museum. One of these fell at Pirthalla, a village in the Hissar district, at 2 P.M. on the 9th February last. Mr. Medlicott says:—"The stone was received in three pieces, and otherwise damaged, having lost perhaps an eighth of its original bulk. The pieces weighed severally 510·0, 425·7, and 224·2 grammes, or a total of 1,160·5 grammes. The specific gravity is 3·40. The shape was roughly cuboidal with rounded edges and indented sides. The stone is of the most usual type, granular fracture of light-grey colour, mottled pale brown. The numerous metallic grains of various size and shape only appear on a cut surface, being otherwise covered by a coating of the stony substance. This stone is rather friable. There is of course the usual film of fusion, of a dull black colour. The account of the fall received with the specimen is as follows :—"The history of the meteorite briefly is, that it was seen to fall at 2 P.M. on the 4th February 1881, about 150 paces from the village of Pirthala, [illegible] S. Tohana, Hissar Division, by a sepoy [illegible] Sikh [illegible] and a boy of 12 years of age. It seems [illegible] been red-hot when falling, and an explosion was heard while it was still in the air which was followed [illegible] report like that of a gun when it struck the earth, in which it was buried to the depth of 2½ inches. The ground was hard. It was dug up immediately, and is said to have been quite cold, and broken in two."

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The other meteorite fell at Chandpur, a village near Mynpooree in the N.-W. Provinces, on the evening of the 6th April last. The following is Mr. Medlicott's description of it :—"The stone was received broken, though about one-fourth of the crust, and portion [illegible] of the original bulk, had been chipped off. The shape was roughly cuboidal, with rounded edges and angles. Before cutting, the weight was 1201·[illegible] grammes; [illegible] pieces weigh 625·[illegible] and 491·0 grammes. The specific gravity is 3·50. It is [illegible] of the same type as the [illegible] but not so brittle. The following is a [illegible] of the fall by the Native Sub Inspector of [illegible] :

"On 10th April Gurdial [illegible] Chaukidar of [illegible] Chandpur, which is [illegible] south of the [illegible] station, came and reported that four days ago, on [illegible] Monday, there was thunder and lightning [illegible] sky, and after this a stone came down, [illegible] and weighed [illegible] and 4 chittacks. [illegible] fetch the [illegible] clerk accordingly [illegible] the stone [illegible] is black. It is white inside, containing shining particles like those of sand [illegible] broken [illegible] the fact that [illegible] what was inside before the clerk [illegible]. The pieces broken off could [illegible] enquiry made by the [illegible] that on Monday about [illegible]-half [illegible] heavy clouds came over [illegible] Chandpore; that [illegible] Singh Thakur and [illegible] and [illegible] Chamars were busy in stacking arhar stalks in a field about 100 paces south-east of the village, and [illegible] they first saw lightning in the clouds and then heard [illegible] thrice; that afterwards it thundered slowly, and then of a sudden the whole sky was lit up and a sound of [illegible] coming down (sain-saine) was heard, and [illegible] the sound of a thud in the arhar field of Madari [illegible] field beyond their own; that they then [illegible] respective houses, fearing that hail was falling. As the [illegible] affair was one of a surprising kind they [illegible] Tuesday morning wanted to find out what it was, and on search, found the stone produced in Madari's field; that it was still warm, and the earth below it was blackened, and a plant of arhar on which it had fallen, was scorched and broken down, but that no mischief was caused to other plants in the field. Other villagers also testified to these facts. [illegible] the stone for your inspection."

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We take the following from the proceedings of the Agri-Horticultural Society of India, dated 22nd May 1885, regarding the value of pyrethrum powder as an insecticide :—"Messrs. Farey & Co. made some enquiries at the suggestion of their Manager, Mr. A. S. Penny, regarding the insect-destroying properties of the pyrethrum, and whether any experiments had been made with the plant in India. As there appears to be some misconception as to the virtues of this plant as an insecticide, the following extracts from the Agricultural Bureau's, of Washington, Report for 1883, may prove of interest :—There are very few data at hand concerning the discovery of the insecticide properties of pyrethrum. The powder has been in use for many years in the Asiatic countries south of the Caucasus Mountains. It was sold at a high price by the inhabitants who successfully kept its nature a secret until the beginning of the century, when an Armenian merchant, Mr. Jumtikoff, learned that the powder was obtained from the dried and pulverized flower-heads of certain species of pyrethrum growing abundantly in the mountain region, of what is now known as the Russian province of Transcaucasia. The son of Mr. Jumtikoff began the manufacture of the article on a large scale in 1828, after which year the pyrethrum industry steadily grew, until to-day the export of the dried flower-heads represents an important item in the revenue of those countries. Still less seems to be known of the discovery and history of the Dalmatian species of pyrethrum (*pyrethrum cinerariofolium*), but it is probable that its history is very similar to that of the Asiatic species. There is also very little information published regarding either the mode of growth, or the cultivation of pyrethrum plants in their native home. As to the Caucasian species, we have reason to believe that they are not cultivated, at least not at the present time, statements to the contrary notwithstanding. As to the Dalmatian plant, it is also said to be cultivated in its native home, but we can get no definite information on this score, owing to the fact that the inhabitants are very unwilling to give any information regarding a plant, the produce of which they want to monopolize. For similar reasons, we have found great difficulty in obtaining even small quantities of the seed of *P. cinerariofolium*, that was not baked or in other ways tampered with to prevent germination. Indeed the people are so jealous of their plant that to send the seed out of the country becomes a serious matter, in which life is risked. The seed of *P. roseum* is obtained with less difficulty, at least in small quantities and has even become an article of commerce, several nurserymen here, as well as in Europe, advertising it in their catalogues. In regard to the manufacture of the powder, the flower-heads should be gathered during fine weather, when they are about to open, or at the time when fertilization takes place, as the essential oil that gives the insecticide qualities reaches, at that time, its greatest development. When the blossoming has ceased, the stalks may be cut within about four inches of the ground and utilized, being ground and mixed with the flower [illegible] in the proportion of one-third of their weight. Great care must be taken not to expose the flowers to moisture, or the rays of the sun, or still less to artificial heat."

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We have, during the past three years, largely experimented with it [illegible] many species of injurious insects, and fully appreciate its [illegible] general insecticide, which value has been greatly [illegible] the discovery that it can be most economically used [illegible]; but we are far from considering it a universal remedy [illegible] insects. No such universal remedy exists [illegible] pyrethrum has its disadvantages, as has any other insecticide now in use. The following are its most serious disadvantages :—(1) the action of the powder, in whatever form it may be applied, is not a permanent one in the open air. If, e.g., it is applied to a plant, it immediately affects the insects [illegible] plant with which it comes in contact, but it will be perfectly harmless to all insects which come on to [illegible] half an-hour (or even less) after the application; (2) the powder acts in the open air—unless, perhaps applied in very large quantities—only upon actual contact with the insect. If, *e. g.*, it is applied to the upper side of a cotton leaf, the worms that may be on the other side are not affected by it; (3) it has no effect on insect eggs nor on pupæ that are in any way protected or hardened. These disadvantages render pyrethrum in some respects inferior to arsenical poisons, but on the other hand it has the one overshadowing advantage that it is perfectly harmless to plants or to higher animals. In a closed room the effect of pyrethrum on insects is more powerful than out-doors. Different species of insects are differently affected by the powder. Some resist its action most effectually, *e.g.*, very hairy caterpillars and especially spiders of all kinds; while others, especially all hymenoptera, succumb most readily. In no cases are the insects killed instantaneously by pyrethrum. They are rendered perfectly helpless a few minutes after application, but do not die till some time afterwards, the period varying from several hours to two or even three days, according to the species. Many insects that have been treated with pyrethrum show signs of intense pain, while in others the outward symptoms are less marked. Differences in temperature and other meteorological changes do not appear to have any influence on the effect of pyrethrum." The modes of application are then given in the report: they are four in number—in powder, fumes, alcoholic extract, and in decoction. but any of the methods would be found extremely expensive, if tried on field cultivation on a large scale.

MERGUI EXPERIMENTAL PLANTATION.

THE province of British Burmah is not behindhand in the matter of experimental plantations of economic products. Last week we noticed the result of the experiments tried in two gardens in the Arakan Hill tracts, and now we have before us a report by Mr. C. W. Palmer, Deputy Conservator of Forests, South Tenasserim *Division*, on the Mergui plantation, for the year 1884-85. Mr. Palmer's report, we may premise, is brief to abruptness. For instance, we are not told what area the plantation occupies, what the soil is like, whether alluvial, deluvial, sandy or clayey, rich or poor; whether the facilities for irrigation were favourable or otherwise, or, in short, anything calculated to make the report both interesting and instructive. There is not a word as to how the several plants cultivated were treated; whether any manures were used, and if so, of what kind. We are therefore constrained to characterise this report as decidedly *bald*. The opening paragraph runs as follows:—

> There are 1,350 bearing Liberian trees, 708 young trees, and 2,254 seedlings. The growth of this coffee has been very fine; the bearing trees are 8 to 12 feet in height, age 3½ years, and gave last season a heavy crop. It is not possible to give any definite quantity of coffee produced, as the whole amount was collected by the plantation gang.

This affords a fair idea of the style of this report; the succeeding paragraphs, six in number, are strikingly monotonous. We make out that there are 920 trees of the Arabian coffee in a bearing condition, and 1,268 seedlings; and that the produce from these was very small; therefore, all the seed was sown on the plantation. There are cocoa trees which appear to thrive well, and are expected to form pods. The nutmeg is also said to have done well, the only difficulty being found in getting the seeds to germinate. The Vanilla creeper is reported as not only thriving well, but that it has flowered. Mr. Palmer says:—"I tried my hand on fecundating [we presume he means *fertilizing*, as this is the term used in botany.—ED., *I.A.*] these, but am afraid I have not succeeded. I cannot understand Mr. Connor's mode of fecundation." That an officer holding the post of Deputy Conservator of Forests should make such an admission, and display such ignorance of the *elements* of botany, passes our comprehension! The word "fecundation" is used only when applied to animals. Its synonym, when applied to the vegetable kingdom, is "fertilization." We trust Mr. Palmer will bear this in mind when he is called upon to use the word on a future occasion. The report, we regret to have to say it, is utterly devoid of interest or information, and we are not surprised that the Officiating Secretary to the Chief Commissioner of British Burmah should make the following remark:—

> At the time this garden was started, the Chief Commissioner directed that the experiments should be chiefly confined to the cultivation of coffee, cardamoms, vanilla, cocoa, as well as tea, as these were the products which Government was anxious to introduce into the neighbouring district of Tavoy. The present report makes no mention of either cardamoms or tea, and it is not known whether the cultivation of these plants has been abandoned. The report might with advantage give more particulars regarding the experiments made.

We note that the usual grant for this plantation is to be continued for the current year; but we take this opportunity of expressing a hope that the Chief Commissioner will select some officer more fitted than Mr. Palmer to carry out these experiments, as the results of such experiments are likely to have an important bearing upon the future growth of economic products in British Burmah, and which our officers should endeavour as far as possible to promote. It is to the interests of the State and the people that we should have properly written reports, dealing in sufficient detail—technically, as far as possible—upon these experimental plantations.

DESTRUCTION OF WILD ANIMALS.

A RECORD such as that presented by the returns of the destruction of wild animals in the Madras Presidency for the year 1884, will scarcely, we venture to think, find a parallel in any other country in the world outside of India. One shudders to think what it must have been a hundred years back! The system of giving rewards for the destruction of dangerous animals has been in force for many years, and yet, after a wholesale killing during these years, the total number of animals destroyed during the year 1884, in the Madras Presidency alone, amounted to 4,033 of all descriptions, compared with 2,708 in the previous year; while the sums paid as rewards increased from Rs. 64,136 in 1883, to Rs. 1,16,246. The various species of animals killed, and the number of each species, compared with the results of the previous year, are as follows:—

	1884.	1883.
Elephants ...	6	0
Tigers	321	185
Panthers and Leopards ...	2,195	1,565
Bears	541	298
Wolves	230	93
Hyænas	715	457
Other animals ...	25	109
Total ...	4,033	2,708

The "other animals" include, for the most part, foxes, jackals, and wild boars. The foregoing figures show a great improvement over those of the previous year.

The total loss of human life, and of cattle, by wild animals and snake-bite, is detailed below, in comparison with the figures of 1883:—

	Human Lives.		Cattle.	
	In 1883.	In 1884.	In 1883.	In 1884.
By Elephants ...	5	5	1	6
,, Tigers ...	267	139	3,460	3,129
,, Panthers and leopards	49	44	4,418	4,701
,, Bears	28	8	30	68
,, Wolves	3	1	416	336
,, Hyænas	6	0	308	333
,, Other animals ...	24	58	188	183
Total ...	382	255	8,821	8,761
By snake-bite ...	1,267	1,191	278	304
Grand Total	1,649	1,446	9,099	9,065

It will thus be seen that there is a decrease of 202 in the loss of human lives, compared with the previous year, although the decrease in cattle is inappreciable. But what strikes us as curious, is that by far the largest number of lives lost were by snake-bite; and what is still more curious, there is, apparently, no reward offered for the destruction of snakes. It is pretty generally known that natives will not, as a rule, kill snakes, owing to superstitious beliefs; but we venture to think that if rewards were offered, it might act as an incentive to the extermination of these reptiles, while it would, at the same time, grease the conscience of the more superstitiously inclined. That this can, and has been, the case, note the remark made by the Special Assistant in Ganjam, who explains the large increase in the number of animals killed in that district as follows:—

> "The maximum reward being now paid in all cases has had the most satisfactory results. In several places regular cheetah traps are used; in all places pit-falls are dug for wild animals to fall into. The last is quite an innovation, as *from superstition the Khonds used to be afraid of slaying a cheetah for fear of destroying one of their ancestors.*"

[The italics are ours.] It also appears that the full rewards sanctioned have not always been paid; that, in consequence, parties have, in some cases, not come forward to receive their rewards. We are glad to see, however, that the Madras Government has drawn the particular attention of Collectors to this point. We also note that in the case of Madura, the low average is said to be due to *rewards not having been paid in some cases.* This has also engaged the attention of the Madras Government, and we hope to see better results next year.

There is another point to which we would direct attention, *viz.*, the small number of the "other animals" destroyed. Jackals are generally believed to be harmless, unless in a rabid condition. We note, however, that there were no less than *fifty-eight* persons killed by "other animals," while in Malabar one person was actually *killed* by a *porcupine*. The total number of "other animals" destroyed during 1881 was 25, and the rewards given amounted only to Rs. 3. This would give an average of one anna and eleven pie per head of animal, which is certainly not a very strong inducement for their destruction. We hear almost every day of jackals carrying off infants in arms and attacking young children. Unless more encouragement is given, by the offer of reasonable rewards, satisfactory results cannot be expected in this direction.

The return under review brings to light something of the ludicrous as well, by a display of ignorance of the character of "wild animals," which we were not prepared to expect from an officer of the rank of Collector. It will interest our readers to learn that the Collector of Madras has included in his return the number of persons who died of rat-bite, dog-bite, kick by a horse, and scorpion-sting; and in Madura a person killed by a bull is shown under "other animals." Upon this the Madras Government naively observe that "these have been excluded from the Board's statement, as the deaths were not caused by wild animals." The following table shows the number of persons and cattle killed by wild animals, the number of wild animals destroyed, and the amount of rewards paid for their destruction, in each of the past five years:—

Years.	Number of Wild Animals destroyed.	Rewards granted.	Number of Persons killed by Wild Animals.	Number of Cattle killed by Wild Animals.
		Rs		
1880	1,24	16,580	223	8,667
1881	1,429	20,251	238	8,668
1882	2,055	44,111	275	8,770
1883	2,708	64,133	382	8,821
1884	4,033	1,16,246½	255	8,761

So that during the past five years there have been no less than 11,509 animals destroyed, at a cost of Rs. 2,62,324, which killed 1,373 persons, and 43,667 cattle; and this in the Madras Presidency alone. A ghastly record, truly!

Miscellaneous Items

Fifty thousand rupees' worth of copper coinage, forwarded by the Bombay Mint, has arrived in Bangalore for the Mysore Government.

Lord Dufferin having sent the Sultan a collection of rare and very valuable Indian plants, his Majesty, who is very pleased with the present, ordered his thanks to be conveyed to the Viceroy.

Cholera and small-pox still prevail in a few districts in Berar. Fever, measles, and bowel complaints are reported in all districts. Cattle are free from disease, except in the Basim district. Sowing operations have nearly been completed.

The Eurasian and Anglo-Indian Association of Madras is endeavouring to form an Agricultural Library at its colony in Whitefield for the benefit of the settlers there, and it is with very great pleasure we note that Messrs. Higginbotham and Co. have made a most liberal gift towards the project in the shape of one hundred volume of works, bearing principally on agricultural and kindred topics. This will form a most valuable nucleus, aided by the contributions of the several departments of Agriculture in India and Burmah, whose sympathy has been enlisted.

The revenue of the colony of Australia for the financial year, ending June 30, amounted to £7,449,878, an increase of £918,648 as compared with the preceding year. The revenue for the quarter ended June 30 amounted to £2,074,342, an increase of £230,937 on the corresponding quarter of last year.

At the office of Mr. Grant, the Collector of Bombay, four plots of land situated at Middle Colaba, near the Wodehouse Bridge, were put up for sale. There were only five persons present: three Jews and two Parsees. After the conditions of sale had been read, those present declined to bid as the upset price of Government was Rs. 10 per square yard. The plots are numbered 5, 6, 7, and 8, and their superficial area are, respectively, 1,705, 1,686, 1624, and 1,548 5-9 sq. yards. It appears that an offer has been made to Government of Rs. 7 8 per sq. yard. No sale was effected.

From next month the sales of Cinchona bark on account of the Government of Madras will be held at Madras on the first Monday in each of the four months of September, October, November and December. The sales will be by public auction, and the Government guarantees that for the next two years the quantity offered will, *be not less than 70,000 lbs per annum, in quantities of not less than 17,500 lbs. at each of the four monthly sales.* The bark offered will for the next two years at any rate, be the various varieties of "crown" exclusively, and samples accompanied by analyses made by the Madras Government Quinologist will be available at Madras for a fortnight before the sales and at the India Office for intending purchasers on specified dates.

The Committee of the Kandy Agricultural Art Exhibition has set an excellent example to the older institution of Colombo by publishing its reports and accounts so shortly after the show, and with most satisfactory results, showing a balance in hand to be carried to the credit of next year's account, of Rs. 1,059. As a correspondent has very properly suggested, the Colombo Committee should be called upon to make known its proceedings and the state of its accounts, fully a year having passed without any statement having been made. It is pointed out with some force that this Committee cannot well make an appeal to the public for another show until it has rendered an account of its stewardship in the past. The members of the Committee should call upon the Treasurer and Secretary to come forward with some sort of statement.

So early as December last, certain inhabitants of the villages of Babuim, Eesur, Borwalli, Simpoli, Dysur, and other places of the Salsette Taluka, traders in fish-manure, applied to the Collector of Tanna, representing to that official the impassable state of the roads leading from Bombay to Ghorebunder, and praying that steps be taken to extend the said road for the purposes not only of ordinary traffic, but also for the greater facilities of trade. While the B., B., and C. I. Railway Company, with an eye to business, have seen the *advantages of traffic with these villages, the Government authorities have remained strangely inactive.* Meanwhile, the poor villagers, who maintain themselves principally by this fish-manure trade, along with a local trade of minor importance, have had to contend with great difficulties, as appears from the correspondence which has been passing between them and the local authorities.

In December, 1884, the Madras Government made an engagement with M. Cornet for the sinking of an artesian well in or near Madras. The depth of this well was estimated at 293 feet, and the cost at Rs. 15,000. Upon the recommendation of Dr. King, of the Geological Survey, who selected the People's Park as the best spot for an artesian well, borings were commenced in March last, and after reaching a depth of 58 feet, granite rock was met, which was found very hard and difficult to bore through. In order to ascertain whether this granite was merely a detached boulder, or part of the strata of the earth in the locality, trial borings within a diameter of 50 feet were made, but they all showed that the same granite was to be met with. The boring operations in the Park were accordingly abandoned, and the result of the search of the country around indicated that a stratum of granite existed for two miles north of the Fort and some miles inland. This being the case the Government has stopped the operations for the present, pending a selection of some other site by Dr. King.

An advertisement will have been noticed a few days ago in the columns of the *Pioneer*, conveying a public-spirited offer from Mr. G Jasper Nicholls, C.S., to send, at his own expense, anyone applying a supply of seeds of the *Bambusa balang*. But probably few people not botanists appreciated the meaning of the offer. The *Bambusa balang* is not only the largest bamboo grown in India, outside of Burmah and Assam, but from its habit of flowering only once in 55 or 60 years it is also excessively rare. Some specimens exist at Jubbulpore, where they are remarked by every visitor for their beauty and size; but until these should have arrived at the time for maturity and decay, in another 40 years or so, it was not known that there would be any seed procurable, in these parts of India at any rate. Mr. Nicholls, however, was fortunate enough to discover a clump in full flower recently on the banks of the Mahanadi, in Raipore, and knowing what it was, had all the seed scrupulously collected by the villagers, and in the hope of getting the tree widely distributed over Upper India, he is now offering it to the public. The *Bambusa balang* grows to a height of over 60 feet; its tall stem gives the best natural material for scaffolding, and in beauty as well as size it may claim to excel all the varieties of bamboo known to the Ganges plain and Deccan highlands.

Selections.

SERICULTURE IN FRANCE.

From Monsieur NATALIS RONDOT, President of Section in the Permanent Commission of Customs Values, To his Excellency the Governor-General of British India. Dated Paris, 17th June 1884.

I HAVE the honour to submit to your Excellency a circular and series of questions which the Chamber of Commerce of Lyons has distributed regarding sericulture and the silk industry.

The Chamber of Commerce of Lyons has founded, on my recommendation, a laboratory for the study of silk-worms and silks, and is collecting the materials for the study from all parts of the world.

The chief aims of the work to be undertaken will be to complete the nomenclature of all the silk-producing families, to describe scientifically each species, variety, sub-variety, race, while at the same time determining precisely the qualities of the cocoons and of the silks which they yield. Trials of a technical nature will, therefore, accompany the more scientific investigations.

India, if we believe several observers, among others Captain Hutton, possesses several species of domesticated silk-worms which are still at the present day unknown in Europe.

Entomologists and rearers of silk-worms in France and Italy have not seen nor had an opportunity to study and experiment with the species which, under the names of *Bombyx textor, F. fortunatus, B. croesi, B. sinensis, B. arracanensis*, furnish India with crops of cocoons.

The Chamber of Commerce of Lyons, and with it the entire silk industry, would attach great value to the possession of selected specimens of worms, moths, cocoons, and silks of these species, and all others reared or wild in India.

India has of course other silk-worms which are interesting in more respects than one; and I venture to hope that your Excellency will be willing to sympathise with us in the project of general usefulness which we have in view.

The studies which are to be undertaken will profit all those who follow sericulture. The results will be made public.

The first studies will be confined to the materials furnished by the Italian Government; and numerous rearers in different countries are co-operating in this work which is one of an entirely new character.

CIRCULAR.

From the President of the Chamber of Commerce of Lyons.

THE Chamber of Commerce of Lyons, on the proposal made by M. Natalis Rondot, has decided that it would be interesting, and of practical utility to undertake a series of studies on the silk-producing worms of every country, on the cocoons of these worms, and on the silk which can be obtained from them by reeling or spinning.

Our Chamber proposes to itself a two-fold object :—

(a) to determine, with the greatest possible precision, the genera, species, and varieties of the domesticated, semi-domesticated, or wild worms.

(b) to ascertain the richness in silk of the cocoons, envelopes or silky coverings, the nature and quality of the silk obtained, and in particular the colour, fineness, tenacity, elasticity, yield of raw silk, and the aptitude for taking dye, &c.

Our Chamber undertakes these researches and experiments chiefly in view of the practical results which it foresees; it will prosecute them with perseverance as much in the interest of sericulture as in that of the manufacture of fabrics and of the commerce in silk. This study will at the same time be of profit to science, and we hope that it will help to clear up more than one obscure point in the history of the silk-producing worms.

A permanent Commission appointed by the Chamber of Commerce will direct the work annually and report on the results obtained.

The materials on which the experiments and studies are conducted will be deposited in the Museum of the Chamber of Commerce.

This project which is quite a new one, and is surrounded by so many difficulties, will be profitable to all; it cannot be brought to a satisfactory conclusion without the active and intelligent co-operation of all who value the improvements which the course of events introduces into the silk industry, as well as the discoveries in this hitherto neglected field of science.

We shall be glad, Sir, to reckon you among our collaborators in the work which we are undertaking, and to preserve your name as one of the donors of the specimens, now solicited, for our Museum of Art and Industry.

You will find annexed two series of questions accompanied with explanatory notes,—the one concerning the species of domesticated silk-worms, the other the species of semi-domesticated and wild silk-worms; we solicit your careful consideration and favour of early replies.

It is, of course, understood that our Chamber will be glad to refund all the expenses which you may incur.

CHAMBER OF COMMERCE OF LYONS.

INQUIRY INTO, AND STUDY OF, SILK WORMS.

Questions regarding the domesticated or mulberry silk-worms.

1. What species or variety do you cultivate? Where is it found wild or semi-wild? Where and under what name do you purchase your seed or eggs?

2. Is your insect pure or a hybrid; and, if the latter, out of what stock has it been produced?

3. Is the insect univoltine, bivoltine, trivoltine, polyvoltine?

4. How many moultings does the worms go through?

5. What is the colour of the skin of the worm at each age, particularly in the last age?

6. Do all the worms of one brood come out the same colour?

7. Is the worm characterised by spots, streaks, tubercules, horns, hairs, or has it a spur or other peculiarities.

8. When does the rearing commence, and how long does it last from the hatching of the egg to the moulting of the worm?

9. What species or variety of mulberry plant serves as food for your worms? By what name is it locally known?

10. What is the nature of the soil in which it grows?

11. Is the leaf given to the worm after being detached from the twigs, or is it left attached to them?

12. What is the average weight of fresh cocoons obtained per English ounce of eggs? (The Indian *tola* may be taken as equal to 2 ounces.)

13. How many cocoons go to a pound (or ½ *seer*)?

14. How many pounds of fresh cocoons yield one pound of silk?

15. If more than one crop is obtained in the same year, give for each crop detailed information as to time of the year, duration, characteristics of of the broods or swarms, moulting, average produce, &c. How many successive hatchings take place in the year? What is the name given to each successive hatching and crop?

Questions regarding semi-domesticated or wild worms which produce cocoons, envelopes or silk coverings.

1. Under what vernacular or commercial name is the species known in the country?

2. Give the vernacular names in Oriental character.

3. Are the specimens the product of semi-domesticated or wild worms? (*By 'semi-domesticated' is meant worms hatched in-doors and transferred to trees in the open air under supervision. Wild worms are entirely independent, and are left to themselves in the open air*).

4. Is the species univoltine, bivoltine, trivoltine, polyvoltine?

5 What is the ordinary number of successive hatchings (semi-domesticated or wild) during the year?

6. How many moultings does the worms pass through?

7. What is the colour of the skin of the worm? (*If possible, the age at which the observation is made should be stated*).

8. Is the worm characterised by spots, streaks, tubercules, horns, hairs, or has it a spur or other peculiarities?

9. Have you observed any differences in the colour of the skin, or in other respects in individual worms of the same brood? (*Compare with question No. 6 above*).

10. At what time of the year does each successive rearing commence and finish? What is the name given to each rearing? (*It would be very interesting to have specimens of each rearings, but if the product of only one be sent, indicate precisely what relative position it occupies amongst the different rearings of the year*)

11. How many cocoons go to a pound?

12. Are the cocoons open or closed, and are they suspended to branches by a stalk (peduncle), or are they closed within a leaf (or leaves) of the tree, or in a silky envelope?

13. Send the silky envelopes, whether thick or thin, within which the cocoons are spun or the worm transformed into the chrysalis.

14. Are the cocoons reeled or spun (combed and carded to fibre, thereafter spun like cotton) ?

15. What is the price of a pound of dry cocoons ?

16. How many pounds of dry cocoons are necessary to obtain one pound of silk reeled or spun ?

17. Give the names (scientific or vernacular) of the trees or shrubs on which the worms feed ?

18. In what kind of soil do these grow ? *(In the cases where the same species of worm produces cocoons of different colour or nature, according to the tree on which it feeds or the soil in which the plants are grown, send specimens to illustrate this peculiarity.*

The preceding questions are those to which the Chamber of Commerce of Lyons invites particular attention, but the following are also important :—

19. Is the species abundant ?

20. What method is adopted in reeling the silk, and what liquid is used to soften the cocoon ?

21. To what use is the reeled or spun silk put in the country ?

22. What means are employed to check the ravages of destructive insects (destructive to worm, cocoon, or plant) ?

EXPLANATORY NOTES.

1. *Transmission of dead specimens.*—It is recommended that a collection should be made of worms, cocoons (envelopes or coverings of silk), moths, and eggs of every species which produces silk whether domesticated, semi-domesticated or wild.

As regards domesticated species, those should be chosen which are supposed to belong to a primitive type, or pure race. When hybrids are selected, all that is known of the ancestral types should be stated.

It is requested that, as far as possible, each well defined type be represented by a set of the most characteristic specimens.

("A few exceptionally large samples, as also diseased or bad specimens, would also be interesting if declared as such ; but the chief collections should represent the average condition."—*G. W.*)

Moreover, every worm which produces a silky substance deserves to be studied, and none should be excluded, even though it should be already well known or commercially utilized. It is of great interest to study and compare every silk-worm and its products.

It would, for example, be exceedingly instructive to collect sets of specimens, in the case of a polyvoltine species (worms, cocoons, and moths) of each successive rearing ; and also to preserve, in the case of the same species, the worms, the cocoons, and the moths which exhibit exceptionable and notable differences.

2. *Label.*—All the specimens of the same species should bear the same serial number and the same label, so as to prevent confusion in unpacking and during the preliminary classification.

("It is an excellent plan to have a distinctly different coloured thread attaching the labels of each set, so that, should by any accident the ticket be removed, the thread may assist the identification."—*G. W.*)

3. *Worms.*—The worms should be preserved in alcohol (in the absence of alcohol in a strong alcoholic liquor) in well stoppered bottles, of which the stoppers should be securely fastened. The age of the worm should be indicated. A dozen worms at least are requisite of each species of form ; and it would be well, as has been said above, to *add* worms exhibiting differences in colour, marks, horns, as also sets of worms after each moulting, &c.

Since alcohol alters the colour of the skin of the worm and often changes the appearance, it would be, well, when possible, especially in the case of worms of the fourth age, to make a coloured drawing life-size, in order to show the exact colour and size of the worm.

("With a little practice, dry worms may be prepared, which will be found to preserve all the natural colours and external peculiarities. Drop live worms into a bottle of strong alcohol so as to kill them quickly. Get a slab of glass or marble, and, as soon after killing the creature as possible, lay it on the slab with the head towards the operator. Roll over it a pencil firmly pressed and slowly, from head to *anus*, as so to expel the entire entrails. Catch up the tail extremity and insert at the ruptured and slightly enlarged anal opening a pointed piece of fine glass tubing attached to an india-rubber ball syringe. Through the contraction of the ball syringe cause in this way a current of air to pass into the worm until it has been dilated to the natural size. While doing so, hold the glass rod tipped with the flaccid and dilated insect over a gentle heat from a spirit lamp. It will harden in any position you may desire, and in the great majority of cases will so preserve its colouring and markings that, if placed upon a dried specimen of the plant upon which it naturally feeds, it will appear alive. Unless great care is taken, however, the specimens may be unnaturally dilated, but for handsome collections illustrating the plant and insect in all its transformations, this will be found an exceedingly interesting mode of preserving the caterpillars."—*G. W.*)

4. *Dry (or desiccated) cocoons.*—Cocoons in a dry natural state, *i.e.*, not deprived of their outer fibres, should be selected from the best specimens. They should represent the normal type of the species. One pound at least is required for experimenting with the silk. In default of this quantity, as many cocoons as possible should be sent.

Take the necessary measures to prevent the cocoons from being destroyed by parasitical insects during the voyage.

5. *Moths.*—The moths should be placed with extended wings in envelopes of soft paper. Several specimens would be useful for the scientific studies, and for exhibition in the Museum.

("In drying large-bodied Indian insects, it is often necessary to carefully cut open the body below and partially remove the entrails, placing a small piece of cotton wool within to prevent contraction.—*G. W.*)

6. *Eggs.*—The eggs should be, as far as possible, preserved in the natural layers or deposited on card board, cloth, or on the leaves of the tree on which the worm feeds, in order to shew their natural grouping.

("In the same manner the cocoons should be sent in the natural or undisturbed condition in which they are formed by the worms. This is particularly interesting in the case of insects which form great aggregated masses."—*G. W.*)

7. *Leaves and flowers of the trees which serve as food.*—The tree on which each species feeds should be represented by one or two dried flowering or fruiting leafy twigs.

("These are easily enough preserved. Cut off a twig, say, one foot or a foot and half in length. It should have 2 to 6 leaves with a few flowers or a fruit. Place it between sheets of soft country paper unglazed, or simply ordinary blotting paper. Over the top put a couple or so of books to keep the specimen flat. Change into fresh paper two or three times, *e. g.*, about every alternate day until dry. The same paper will last for years if dried at the fire or in the sun between each time it is used."—*G. W.*)

8. *Silks.*—It would be desirable to add to the collections of insects small samples of their corresponding silks (such as are obtained in the locality), *viz.*, reeled, spun, waste, chassam ; also tram and manufactures.

In conclusion, we particularly desire precise information as to the names given in the country to each form of insect, also the tree on which the worms feed ; and all information that can be given in addition will be gratefully received.

9. *Transmission of live specimens of eggs of silk worms and of seed cocoons.*—It is intended to compare dead worms or trade sample with worms reared in the laboratory and observed in their living state, as this is indispensable to arrive at the object which is in view. It will therefore be necessary to rear either the live eggs, or the seed cocoons which may be received.

In packing live eggs and cocoons the following precautions should be taken, particularly if the voyage is to last some weeks:—

Shallow boxes should be used, pierced with holes for ventilation, and lined inside with perforated paper. The cocoons should be strung by a thread passing through the silk, but without penetrating the shell. These should then be suspended to the opposite sides of the box, in parallel lines, the lines being kept apart from each other.

During the voyage, should the chrysalides reach maturity and make their escape from the cocoons, the moths will couple, and the females lay their eggs freely. On arrival at their destination, the interior of the box will be found strewn with eggs in good condition for hatching.

Live eggs should never be sent in hermetically closed boxes with camphor. Each species should be placed in separate small boxes, pierced with holes and lined with perforated paper. The cocoons should be either placed in small boxes pierced in the same way, or in cloth of open texture so as to provide continuous ventilation.

Note.—The above is a free translation of the original correspondence and circular. It has been modified only where necessary to meet the requirements of India. A few additions have been made, but all departures or additions are indicated by the inverted commas placed before and after such passages. The word a 'brood' and a 'rearing' (see No. 9 of the second set of questions) are intended to have the following meaning:—*brood* or *swarm*, the produce from the eggs of one individual ; *rearing*, the whole hatching or batch at a certain season—an aggregation of broods. The weights have been changed from French to English and Indian.—*G. Watt*, on

Special Duty with the Government of India, Revenue and Agricultural Department.)

The following extract from the "Dictionary of the Economic Products of India," presently being published by the Revenue and Agricultural Department with the Government of India, may be found useful. It gives a simple classification of the plants upon which the Indian wild or semi-domestic silk worms feed.

AILANTHUS GLANDULOSA, *Desf.*

Incorrectly called the Japan Varnish Tree, *Eng.*; Gotterbaum (*Tree of the Gods*), *Ger.*; Vernis du Japan, *Fr.*

HABITAT.—A lofty tree, met with in North India, most probably introduced from Japan. Extensively cultivated on the continent as an avenue tree along with the tulip-tree, the horse-chestnut, the plane, &c. The leaves are not liable to be attacked by insects, and therefore, until the first frosts of November, the tree remains covered with its large leaves, affording a grateful shade.

BOTANIC DIAGNOSIS.—*Leaves* often exceeding 1 foot, pubescent or sub-glabrous; *leaflets* very numerous, coarsely toothed at the base; *stamens* exserted; *filaments* several times the length of the anthers. *Samara* 1 inch by ½ inch, membraneous linear oblong.

SERICULTURE.—Upon the leaves of this tree the wild silk-worm *Attacus Cynthia, Drury*, is reared in Europe; and, indeed, this is perhaps the most successful tree for the experimental rearing of different species of silk-worms. It grows freely, even in England, and the insect thrives upon it.

ATTACUS CYNTHIA, Bombax Cynthia, *Olivier*, or the so-called wild eri-silk of Assam, exists entirely in a wild condition, and its cocoons, although often plentiful in the jungles, are rarely collected. It is especially common in Cachar and in Kamrup (in Assam), extending west through Sikkim to Mussoorie and Simla, with an average altitude of from 1,000 to 7,000 feet.)

It is anticipated that the rearing of *Attacus Cynthia* upon this tree may become an established industry in Europe.

In connection with the subject of the value of Ailanthus as a food for silk-worms, it seems highly desirable that experiments be performed in India, with the object of producing a *reliable hybrid eri*, which would still preserve the valuable property of feeding upon an annual plant such as the castor oil. The Ailanthus glandulosa has proved a most convenient plant for experimenting with Indian wild insects in Mussoorie; but both for experiments in India and in Europe (as far as the respective climates [illegible]). the following plants are those which would most probably afford *the means of prosecuting the investigations necessary for the production of hybrids of* Indian indigenous silk-worms. The plants have been grouped in a way which brings out the overlappings in habit, as also some of the structural affinities of the more important species of silk-worm.

TEMPERATE PLANTS.

* ACTIAS AND CALIGULA SERIES.

1st.—Rosaceous plants, such as Prunus Cerasus (the wild cherry) Pyrus communis (the wild pear), and Cydonia vulgaris (the wild quince); small trees met with in India on the Himalaya and the hills of the Eastern Peninsula at altitudes of from 5,000 to 10,000 feet.

The following species of silk-worms feed upon these plants in their wild state:—Actias selene, Caligula simla, C. thibeta.

2nd.—PIERIS OVALIFOLIA, an exceedingly plentiful, ericaceous, small tree coming into fresh green foliage just before and flowering during the rains on the Himalaya and mountains of the Eastern Peninsula, at altitudes of from 4,000 to 8,000 feet.

The following insects feed upon it:—Actias selene, Caligula thibeta.

* * ACTIAS AND ATTACUS SERIES.

3rd.—AILANTHUS EXCELSA and A. GLANDULOSA (the former would most probably not succeed in England.)

The following are the insects regularly found feeding upon these trees in India:—Attacus ricini (*the eri silk-worm*) and A. cynthia.

4th.—CORIARIA NEPALENSIS (*Masuri*, Hind.; *Bhojinsi*, Nepal) a small leafy bush, belonging to the natural order Coriarieæ (allied to Moringeæ and Leguminosæ), plentiful on the Himalaya and mountains of the Eastern Peninsula, Burma, and the Straits; altitude from 5,000 to 10,000 feet. Should grow freely in England. This is one of the most curious plants enumerated in this list, and for the purpose of rearing hybrids seems the most hopeful.

The following insects feed upon it in their wild state:—Actias selene, Attacus canningi, and A. ricini.

WARM TEMPERATE PLANTS.

* * * ATTACUS, ANTHERÆA and CRICULA OR THE ERI, MUNGA, CRICULA, and TUSSER SERIES.

5th.—SYMPLOCOS CRATÆGOIDES (*Lu, loj*, *Pb.*; *Lodh*, Kanaun,) S. GRANDIFLORA, and S. RAMOSISSIMA (*Lodh*. Hind.; *Kala Kharani*, Nepal). Small trees or shrubs on the Himalaya and lower hills of India ascending to 7,000 feet in altitude.

The following insects are known to feed upon these plants, or are actually fed upon them, in their semi-domesticated condition:—Attacus atlas, A. ricini (*small red form of Eri*), and Antheræa assama (*the Munga silk-worm*).

6th.—RICINUS COMMUNIS (*Arand, arendi*, Hind.) (the common castor oil plant), cultivated in the plains of India and in the hills up to an altitude of 7,000 to 8,000 feet. Grown as an annual in England, ornamental forms having been produced by the gardeners.

The following are the insects which feed upon this plant:—Attacus ricini (*the Eri silk worm*.—This is its principal food in domestication and also in its wild state. A. cynthia and Antheræa mylitta (*the Tusser silk worm*).

7th.—Species of Laurels, in India, chiefly Machilus odoratissima (*Kawala*, Hind., *Sum*, Ass.) (up to altitude 8,000 feet, the principal food of the *Munga*) and Tetranthera polyantha (*Sitimbur*, Nepal; *Adakuri*, Ass.)

The following are the insects which feed on these plants, as also on one or two allied species of laurels:—Antheræa assama (*the Munga silk*) and Cricula trifenestrata (the common wild, yellow, reticulated cocoon of Burmah and of the south and west of India.) Upon the former tree these insects chiefly feed, both in their wild and semi-domesticated conditions.

TROPICAL PLANTS.

It is necessary to add to the experimental plantation one or two other trees with the view of admitting of a more thorough investigation of the forms and possible hybridisation of the *tusser silk-worm*.

* * * * THE TUSSER SERIES.

8th.—ZIZYPHUS JUJUBA, (*Ber*, Hind.).

9th.—LAGERSTRŒMIA INDICA (*Sida*, Hind., Beng.)

Two small trees or bushes which experience has shown to be perhaps upon the whole the best plants for the cultivation of the tusser-worm.

10th.—TERMINALIA TOMENTOSA (*Sain*, Hind.; *Piasal*, Beng.) and one or two allied species (the myrobolam or wild almond family). These are the trees which the *tusser worm* seems to prefer most in its wild condition.

In the above brief indication of the food materials of certain silk-worms, only the more important species of the general most likely to afford useful hybrids have been mentioned.

It is interesting to observe that this climato-botanical classification brings the indigenous silk-worms of India into groups closely corresponding to those formed upon a more scientific principle. It would almost seem that hybridisation to be successful must pass through these natural affinities. It is remarkable that none of the Indian Saturnidæ (the family to which the foregoing silk-worms belong) show the slightest tendency to feed on the plants upon which the mulberry silk-worms (the Bombycidæ) are reared—a fact which gives some weight to the idea that the latter are not truly indigenous to India. (*For further information consult the account given under "Silk."*)

AILANTHUS MALABARICA, *DC.*

VERN.—*Peru, peru-marattup-puttai, maddi-pál*, Tam.; *Perumarum, pedda-manu-putta, maddi-pálu* Tel, *Peru-marattoli, mattip-pál*, Malt *Madde-dhupa, bdgd dhúpa*, Bomb; *Guggula-dhupada, nd*, Mahr; *Dhup, baga dhup, gogul-dhup*, Kan; *Manda-dúpa*, Hassan *Mattipas*, Anamalia. No Burmese name; *Kambahia, walbiling*, Cingh.

Habitat—A large, deciduous tree, of the evergreen tropical forests, abundant in the Western Ghats; rare in Pegu, but met wild on the eastern slopes, and in the valley of the Tsittoung. Often planted in South India for ornamental purposes.

BOTANIC DIAGNOSIS.—*Leaves* very large; *leaflets* distant almost entire nearly glabrous. *Stamens* exserted upon filaments many times longer than the anthers. *Samara* large rounded at both ends, not twisted.

CONCERNING ENSILAGE.

INDEPENDENCE, Kas., May 28, 1885.

EDITOR, *Farmers' Review*: I have been watching with interest all the matter pertaining to silos and ensilage that has been published in the *Review* for about five years, also all other sources that came under my observation. As the matter has progressed, new principles seem to be discovered that control the preservation of green fodder. It now seems that it is possible that green food may be preserved in a nearly perfect state without expensive silos, and the very troublesome work of weighting down the mass. In the series just published, I am almost led to believe that in the ordinary barn, we may make use of this. In my barn, which is 30 × 40 feet, and 20 feet high, I have a bay 16 feet wide across one end, with no obstructions, and barn floor to drive in with hay. I thought when I completed the study of that series of articles that I could cut up my fodder corn and pack in the bottom of this bay, leaving a space of two feet on the ends and back side, filling three or four feet at a time, and then allow the heat to generate to required point, 122 degrees fahrenheit, and another layer about same thickness, and so continue until I had a mass 12 to 16 feet deep. I thought that I could put up my hay in small, round stacks on the meadow, and when the fodder was secured, could draw in and fill to top of barn, and perhaps fill the ends and sides as I progressed, tramping it down to make a tight wall of it. What I wish to know is, will that be a sufficient protection and weight to preserve it? Also, will there be any danger of the heat reaching a point of spontaneous combustion? I have a good cupola for a ventilator. The opinion of the *Review* on this, if given, may help some others as well as your constant reader. I will give the opinion expressed by our county surveyor, W. P. Rushmore, who is also a reader of the *Review*. He was here this week, and told of a man in the East whom he knew fifteen years ago, who had a brick barn with a basement. He hardly allowed his clover to wilt, when he put it away in that tight barn. When the clover came out in the winter, the bloom of the clover even was preserved as good as when it was green.

D. W. KINGSLEY.

The objections to the above plan are these: The fodder corn cannot be built up with a solid face having the two-feet space proposed at back, side, and ends. The three sides would be exposed to the air all the time that the filling proceeds, and when it came to filling in the space left with hay, there would still be air spaces between the hay and the ragged edge of the silage pile, the effect of which would be the spoiling of a good deal of material. Another objection is that the silage will be at the bottom of the hay, and not accessible till the hay was fed out. Our plan would be to partition off a portion of the bay for silage, boarding it smoothly inside with jointed lumber. Fill slowly according to the latest idea, with uncut corn, taking care to pack closely at the sides and corners so that when it settles there will be no air spaces. Ten feet in width at one end of the bay for a silo, if filled ten feet deep, when fully settled will hold over thirty tons. The space above this might be filled with hay, if desired, and first fed out. The secret of sweet silage is the destruction of the germs of ferment—the bacteria, by heating, and then complete exclusion of air. This latter could not, as we think, be secured on the plan proposed, but could on that we have suggested. A few feet in depth of hay on the top of the silage, well packed down at the sides, would undoubtedly furnish all the cover and weight needed. Our correspondent has all the conditions in his barn for cheaply testing the value of silage, and we should be sorry to have him undertake it on a faulty plan that would result in disappointment and disgust. With the silage resting upon the ground, with no air space below, as should always be the case, and filled as proposed, there would be no chance for spontaneous combustion for which air is an essential requisite. Those who advocate slow filling and the heating of the mass as the filling proceeds, claim that the *cause* of the ferment—the bacteria—being destroyed by a temperature of 122 degrees Fahr. or over, the heat will naturally subside of itself, provided no new germs are admitted by admitting air to the mass. Each addition to the contents of the silo effectually excludes the air from that previously put in, and the presumption is that while the top layer—undergoing fermentation—is hot, the lower ones, from which the cause of the heating has been removed, or rather destroyed, are in process of cooling off.—*Farmers' Review.*

WHAT IS MILK?

MR. PRIMROSE MCCONNELL, F.H.A.S., late professor of agriculture at Glasgow, Scotland, now of Essex, England, recently delivered a lecture upon the above question to the agricultural students at South Kensington, London.

The writer had the honor of learning practical dairying from Prof. McConnell, at his large dairy farm in Ayrshire, Scotland, and will ever remember him as an esteemed teacher and personal friend.

* The summary of the lecture which we here give is from the columns of the *Agricultural Gazette.*

We notice that the lecturer has been criticised in this country for saying "In butter-making, it is found the animals do best when *continually* tied up." We beg to defend our friend by saying that it is understood in Scotland that all stalled cows daily receive sufficient out-door exercise to keep them in good health. They are, however, wholly fed inside.

The lecture is reported as follows:—

The lecturer began by stating that milk was defined as an emulsion of fats in a solution of sugar and albuminoids, and that it had both a chemical composition and a definite structure. The average analysis might be given as follows:—

Water	87·25
Butter	3·50
Caseine	3·50
Albumen	·40
Milk-sugar	4·60
Ash	·75
	100·00

The various ingredients were perfectly defined, and separate from one another, and kept to pretty nearly the same relative proportions—any variation being due principally to peculiarities of breed.

Under the microscope, milk was seen to be composed of a homogenous fluid, in which floated a large number of globular bodies. On closer examination these globules were found to be composed of pure butter-fats, and it was as yet a debated point whether they had actual skins of caseous matter or not. If they had skins, and were equivalent to little sacs of fatty matter, then the action of churning would be to break the sacs and let out the fats, which would then unite into lumps of butter. On the other hand, if ether (which has the power of dissolving fat) is applied, some of the corpuscles are rendered invisible under the microscope and others are untouched, thus seeming to show that some have no shell. Some authorities say there is no actual skin, but that caseous matter is "condensed" into a thicker coating on the surface of these particles of butter.

PRODUCTION.

To understand how milk was produced, it is necessary to have a clear knowledge of the structure of the cow's udder. The mammary gland consists of two halves of highly developed tissue; each half has two teats (the third is abortive), and each teat is literally a hollow bag fastened on to the bottom of the udder. At the top of each there is a cavity, known as the "milk cistern," and from this there ramify tubes in all directions through the substance of the vessels. These tubes grow smaller and finer away from the teats, until at last they end in microscopically small sacs, which are lined with epithelial cells. These sacs are grouped into globules of three to five, and have a common outlet. It is the function of this cell structure to manufacture the milk, or at least the corpuscular part of it. Part of the milk must, of necessity, be simply transuded from the blood through those cells—the water, for instance—as the outside of the globules is thickly lined with blood vessels; but other parts (and especially the butter globules) are manufactured by the living action of the lining cells. New cells are formed behind the old. These are pushed off, and fall into the cavity of the tubes; but before doing so they had the interior metamorphosed into butter particles, the walls disappear, and normal milk is the result. Colostrum, or the first milk after calving, contains a large amount of these cells in an unchanged condition. The activity of these cell structures can be stimulated greatly by proper feeding and general treatment, and the proportion of solids to water increased by rich food, though at the same time the breed and general characteristics of cows have much to do with it.

VARYING COMPOSITION.

This depends much on food, season of the year, time after calving, etc., but on breed especially. Natural milk may have as little as 83 per cent of water, with some 5 to 6 per cent of fats, or as much as 90 per cent of water, with corresponding poverty of everything else. By feeding we can increase the total solids, but not the proportion of any one ingredient. Oil cakes are not the best foods, for it has been proved that fatty matter given to a cow is not turned into butter, but used up in the body, though it thus indirectly leads to the improvement in the general quality of the milk. On the other hand, albuminoids in the food are directly converted into butter-fats as well as albuminoids in milk, and thus in practice it is found that bean-meal and cotton-cake (decorticated) are among the best concentrated food for cows. Washy food reduces the total solids and increases the water. Exercise tends to the using up of nitrogenous matter, and in cows it is secreted as caseine, so that in a cheese-making dairy the cows should pasture outside, while—as rest tends to the conservation of fats—in butter-making it is found the animals do best when continually tied up.

Breed.

The great fact, however, which influences the yield of special components is the breed of the animals. By artificial selection the Jerseys have been developed into a variety which yields milk containing a 5 to 6 per cent of fat (and over). Under the microscope it is seen that the corpuscles are larger than is the case with Ayrshires—which latter have been bred for cheese-making principally, and therefore, have as much caseine as butter in the milk. By keeping the progeny of the animals with the best milk, and judiciously crossing, various breeds have been developed in the course of time whose glands will yield milk rich in one or other of the component parts, and this, irrespective of feeding and treatment. Large butter corpuscles require large gland cells to form them, and these are the result of development. The total solids depends most on food, treatment, etc., and variation of ingredients most on breed. There is no reason to suppose that any breed has as yet reached its "structural limit," and improvement is to be sought in selection, and using butter and milk tests as a guide.—*Farmers' Review.*

SWEET ENSILAGE.

By Professor Sheldon.

It is natural to feel all the more confidence in Mr. Fry's advocacy of ensilage since he makes no extravagant claims, and indulges in no high-flown rhetoric about the matter. Many would-be reformers are carried off their feet by enthusiasm that is wanting more or less in discretion ; but this is not the case with Mr. Fry, who may be regarded as the original pioneer in the domain of sweet ensilage in this country, and his book is the boiled-down result of much study and experiment. Mr. Fry regards the question as beset with difficulties, which can only be met by intelligent attention to details, which are constantly varying, and he declares he has 'neither seen nor heard of a silo which perfectly fulfils the necessary conditions ;' he also declares that even if such a silo were in existence, it would not be 'possible to ensure results always good alike.' This is, of course, obvious when we reflect that the result depends on the quality of the grass or other raw material used for the purpose, on the amount of moisture it contains, on the degree of maturity at which it has arrived when it is cut, on the peculiarities of its growth and structure, on the weather at the time, and on other conditions which provide plenty of scope 'for the exercise of ability and judgment.'

Mr. Fry is more cautious than some writers have been on this topic, when he says that the silo does not render the ensilor absolutely independent of weather and other circumstances ; and in giving this timely warning to farmers who may haply have been carried away by what they have read elsewhere, he is not only doing the best service to ensilage as a system, but is lessening the volume and risk of cruel disappointment. At the same time, the difficulties spoken of may be overcome by careful and intelligent attention, and success is within reach of every man who will take the necessary pains. These points are definitely laid down, *viz.* (1) A perfect silo must be air-tight, water-tight, and 'heat-tight.' (2) The forage put into the silo must not contain more than 75 per cent of moisture. (3) The temperature of the silage must rise above 122 Fahr., or it will be sour. These points are clear enough, but they require the exercise of care and judgment. To a man whose mind has seized principles of the system, there is no more difficulty, all things considered, than in hay-making ; but even in hay-making, we see a great deal of non-success, which is the result not of bad weather only, but also of carelessness and even ignorance on the part of farmers, in so apparently simple a process.

A silo must have even and perpendicular sides, in order that the weighted covering may follow the silage closely as it sinks. The form of it, however, may be round, instead of square or oblong, but in any case the inner surface must be smooth, straight, and perpendicular. Stone or brick walls are plastered with cement ; concrete walls may, perhaps, be made to do without a plastering of cement, and in this event they are probably the best walls that can be used for a silo. It is obvious that the walls, whatever material they may be built of, must be strong enough to resist any pressure that may come against them from the inside ; this pressure, however, is not very considerable. There is no need for a 'drain or other outlet for moisture at the bottom' of the silo. If a doorway is left in the wall for convenience of emptying the silo, it should be made perfectly air-tight before the silage is put in. This may be done without much difficulty, providing the door is well made and strong, the framework properly constructed, and the packing even and sufficient. Perhaps the best way is to break up the doorway when the silo is empty, plastering it inside with cement, like the rest of the inner surface of the silo. The roof of the silo must be high enough above the square to admit of having the ensilage trodden evenly around by the walls and close up to them.

The silage is usually covered with boards or planks and weighted above. The weighting should not be less than 100 lbs. to the square foot, on a silo 15 to 20 feet deep. A shallower silo would require similar weighting, so that it is advisable, on the ground of economy in weighting, to have it a good depth. The covering of planks admits of just so much surface being uncovered at a time as may be advisable, the planks being laid down parallel to the side end from which the silo is emptied. An oblong silo appears to be preferable to a round or a square one, because it exposes a shorter face when the silage is being cut away ; it has, however, the disadvantage of requiring additional walling and plastering. For instance, a silo 30 feet square inside, superficial measurement, would make two oblong silos of 30 feet by 14 feet 6 inches, if the partition wall were a foot in thickness. It is considered that two such silos would afford greater advantages in respect of filling and emptying than one of double the size. The partition wall, however, unless very strongly built, would be a source of weakness all the time, and it would be subject to certain lateral pressure when the first of the two silos was being filled, and when one of them had been emptied. But it may be made strong enough for anything that would come against it, and once made, it is there for good. It would, of course, entail some additional plastering with cement, equal, indeed, to 50 per cent of the whole outer wall surface of the silo.

It is considered essential to cut the crop for ensilage at the stage which is thought fit when cutting it for hay. This is when it has reached maturity, and is about to ripen. 'Sweet ensilage,' says Mr. Fry, 'bears about the same relationship to the green crop from which it is produced, as ripe fruit does from green, and this is the reason why the green crop must be cut at the stage above mentioned—a stage which favours the ripening of the silage in the silo. At this, too, the green crop contains about the right proportion of moisture, *viz.*, 72 per cent. In cases where early crops of rye, oats or clover, are cut to make room for other crops to come on, it will be advisable to let the crop lie cut on the ground for a day or so until the moisture which is excessive for silo preservation has evaporated. Green rye is deceptive in this respect, and great care has to be taken that it contains only the right proportion of moisture. Great stress, indeed, is laid on this point, and as I believe, with all sufficient reason. Crops containing more than 75 per cent of water are unsuitable for preservation in a silo until the proportion has been reduced ; and Mr. Fry's experiments on this point dispose of the absurd claim made by certain enthusiasts that grass can be cut in any sort of weather for storing in silos, and that rain water in it is a matter of no consequence. Mr. Fry says that in no case has he obtained a good result from fodder, which has been so wet, that moisture has been pressed out of it in the silo. Believing that when 75 per cent. of moisture is not exceeded in the silage, no appreciable quantity of moisture will be pressed out of it, he says there 'should be no drain or other outlet for moisture at the bottom.'

The drier the fodder, the greater should be the compression of it in the silo, and the earlier a silo will be opened, the greater weight should be put on it as well. Before a silo is filled a second or any subsequent time, the walls and floor should be carefully washed down with a weak solution of carbolic acid last of all, in order to rid it of fungi and spores that may adhere in places ; this, in fact, is an important matter. The objects aimed at in a silo are to induce a temperature of over 122 Fahr. in every part of it, and to prevent the access of air to the silage after it has been exposed to this temperature. With an ordinary crop of meadow grass, it will be advisable to fill the silo at a slower rate than with green rye, oats, or other bulky crops, in order that the temperature which the mass attains may be diffused pretty equally through the place. About 4 feet added each day appears to be the rate suited to grass until the silo is full, after which it will require filling up at times as it sinks. The temperature of the silo at different depths may easily be ascertained by using a length of gas-pipe to which at one end a steel point has been welded, and which is perforated there by a number of small holes. This may be pushed down to the desired depth, and when it has been in for ten minutes or so, a thermometer lowered down the inside of it by a string will, in a few minutes' time, and on being withdrawn, indicate the temperature of the silage at the spot to which the pipe has penetrated. A bit of cotton wool in the bottom end of the pipe will lessen the risk of breaking the thermometer.

The temperature at from 4 to 6 feet from the surface should reach at least 122 Fahr. in two or three days after filling. Even if it reach 140 to 160 degs. so much the better ; if it do not reach the desired height, this may be regarded as proof either that the stuff is too wet or that the filling and compression have been going on too quickly. As there is no fear that spontaneous combustion will ensue, the temperature may be ascertained closely enough by the aid of an iron rod simply, thrusting it down into the mass and trying its heat by hand when it is withdrawn. Ordinary British crops do not need chaffing for a silo, but they should be evenly spread in it, and well trodden down, specially near the walls.

Our author, who has produced a valuable book, advises farmers to try ensilage at first on a small scale, until they have learnt to make it properly ; then they may extend the system as much or as little as they think proper. The crops ensiled should be of good quality, and in a proper state of maturity, for young, succulent, placid herbage will produce silage of a quality unsuited for the production of good milk. The system of ensilage adds one more resource to the farmer, but it is not calculated to supersede either hay-making or root-growing in any very marked degree. It is obvious that while hay must contain only some 15 per cent. of moisture, and silage may contain 75 per cent., the crop preserved is more easily digestible in the one case than in the other, and silage may be made when hay would be spoilt by the weather. It is easy enough to make good hay in fine weather, and silage can be made when it would hardly be considered fine, though, as it would seem, wet weather is suitable for neither process, though less so for hay-making than for ensilage.—*North British Agriculturist.*

Registered No. 182.]

THE INDIAN AGRICULTURIST.

A WEEKLY

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VOL. X.] CALCUTTA :—SATURDAY, AUGUST 22, 1885. [No. 34.

Health, Crop and Weather Report.

FOR THE WEEK ENDING 12TH AUGUST 1885.

General Remarks.—Rain has fallen in all districts in the Madras Presidency, with the exception of Bellary, where it is much wanted for the dry crops, which are suffering. In Madura prospects continue unsatisfactory, and more rain is wanted in Ganjam, Kistna, Coimbatore, Tanjore, and Malabar. In Mysore prospects are uncertain in consequence of the deficient rainfall. Dry crops recently sown are reported to be withering in many places, and agricultural operations have been retarded. In Coorg seasonable weather prevails, and prospects are good.

Slight rain has fallen generally throughout the Bombay Presidency, but more is wanted in parts of Sholapore, Ahmednugger, Bijapore, Nasik, Khandesh, and Dharwar. Young crops are withering in some districts, and have in some places been injured by insects. In the Berars slight rain has fallen, and crops are promising. In the Nizam's territories rain is much needed for the standing *kharif* crop. In the Central India and Rajpootana States good rain has fallen generally, and agricultural prospects are satisfactory.

In the North-Western Provinces and Oudh heavy rain has injured the crops in some places, and a break is now much needed. The condition of the crops is, however, generally very favourable. Rain has fallen in most districts in the Punjab. *Kharif* sowings have nearly been completed, and prospects are on the whole good. In the Central Provinces the weather is seasonable, and crop prospects are favourable. Transplanting and weeding continue in most districts.

In Bengal rain has been general, but in parts of the Presidency Division more is needed. Some damage has been caused to crops by floods in the Midnapore District and the Bhagulpore Division, but otherwise prospects are generally favourable. The *bhadoi* harvest is yielding a good average outturn. In Assam rainy weather prevails, and the transplanting of *sali* rice is in progress. Tea promises well. Seasonable rain has fallen in all districts in British Burmah, and prospects are good.

The public health is generally fair in most provinces. Prices are fluctuating in the Punjab, but elsewhere they are generally steady. In Bengal the price of rice continues high.

Madras.—General prospects fair, improved in Bellary and Anantapore; in Madura reported to be discouraging.

Bombay.—Slight rain in most districts; more wanted in parts of Sholapore, Ahmednugger, Poona, Bijapore, Nasik, Khandesh, and Dharwar. Young crops withering in parts of Sholapore, Khandesh, Bijapore, and Tanna, and injured by insects in parts of Hyderabad, Upper Sind Frontier, and Bijapore; fodder scarce in parts of Khandesh, Sholapore, Nasik, Ahmednugger, Poona, Bijapore, and Belgaum. Cholera in parts of eighteen, fever and cattle-disease in parts of nine, and small-pox in parts of four districts.

Bengal.—General rain over the whole province; more rain wanted in parts of Presidency division. Floods in Midnapore and the Bhagulpore division have done some damage to the crops. Prospects continue generally favourable. *Transplanting proceeding well in Central and Eastern Bengal; bhadoi harvest is yielding a good average outturn.* Price of rice continues high. Public health generally fair.

N.-W. Provinces and Oudh.—Heavy rain has fallen throughout the provinces, and caused injury to the crops in some districts; a break is much required. Prices are fairly steady, and public health good; cases of cholera reported from Gorukhpore, Allahabad, and Agra.

Punjab.—Rain has fallen in most districts. Health generally good. *Kharif* sowings nearly completed; prospects on the whole good, but more rain is wanted. Prices stationary in some, and rising in other districts.

Central Provinces.—Weather seasonable. Crop prospects favourable; transplanting and weeding continue. Cholera in Raipore and fever in a few places. Prices steady.

British Burmah.—Cholera severe in one district, slight in seven districts, elsewhere public health good; cattle-disease severe in one district, slight in five districts, elsewhere health of cattle good. Ploughing, sowing, and transplanting progressing. Rain seasonable in all districts, except in Prome, where more rain is required, and in Amherst where they have been very heavy, and the crops have been slightly damaged by floods.

Assam.—Weather seasonable. Transplanting of *sali dhan* continues; prospects of tea good. District healthy.

Mysore and Coorg.—Coffee and cardamom crops in good condition. Prices of food-grains stationary. Prospects of season and public health good.

Berar and Hyderabad.—Rain much needed for standing *kharif* crops. Cholera still prevails in the city and suburbs has broken out at Sereea on railway line; general health of people fair. Prices—Wheat 14⅝, course rice 12¾, white *juari* 19¼, yellow *juari* 22½, and *tur* 15⅝ seers per current sicca rupee.

Central India States.—Continuous rain. *Juari* crop much damaged. Health good; slight cholera at Bhopal.

Rajpootana.—Tanks and wells low. Crop prospects excellent up to date. Health good. Prices cheap. Weather fine, passing clouds and mist.

Nepal.—Rainfall sufficient. Prospects good. Cholera decreasing everywhere.

Letters to the Editor.

THE AGRI-HORTICULTURAL SOCIETY OF INDIA.

SIR,—This Society is one of the few institutions of the kind that we have for carrying out agricultural and horticultural improvements in this country, and it should therefore be largely patronised by all classes, both native and European. But it is a painful fact that the Society is not as strongly supported as it should be. Of course, there is no excuse for the rich and prosperous of our country withholding such support, but so far as the middle classes are concerned, I must say that the rate of subscription fixed by the Society is very high. If this was reduced, I am confident it would receive better patronage and support from the public than it does at present, without suffering any pecuniary loss. Of the various advantages the Society holds out to its members, the Mofussil residents may expect to avail themselves of only two. They have no opportunity of either using the Society's Library at the Metcalfe Hall, or voting at their ordinary meetings. Moreover, most of those of the same class as myself would not benefit by the Society's concession of a box of plants gratis every year (itself worth a large sum), or purchasing plants from the Society's gardens at members' rates. Take my personal case, for instance: I am a Government servant, and am liable to be transferred at any moment. I keep a garden on another's ground, and therefore have no incentive to plant anything beyond what I *may* fairly expect to reap the fruits of. At the same time, I wish to be a member of the Society. The only advantages I expect to reap from the Society are—(1) the packets of seeds and (2) the journals it supplies to the members periodically. It is therefore neither fair nor just, and is certainly very hard, that I should be expected to pay at the full rate of subscription payable by Calcutta members who have all the advantages of the Society. I therefore beg leave to suggest that the Society alter its rates for enrolment of members, and reduce its rates of subscription so as to bring it within the reach of all classes. There are already three classes of members, *viz.*—(1) honorary members, who reap all the advantages of the Society without paying for them; (2) corresponding members who are paid for the articles they contribute to the Society's journal; and (3) ordinary members who pay Rs. 32 annually as subscription, and an admission fee of Rs. 8. Why not add a fourth class of members, entitling them only to the seeds and journals, on *half* the subscription paid by ordinary members? To render the Society more popular and largely patronised, I would suggest that the subscription for ordinary members be reduced to Rs. 20, and for mofussil members of the 4th class, now proposed by me, to half the subscription payable by ordinary members.

AN AMATEUR GARDENER.

ENSILAGE vs. GREEN FODDER.

TO THE EDITOR.

Sir,—I trust you will allow me to make some comments on your article, "Ensilage *vs.* Green Fodder." You say you are convinced that silage properly prepared possesses qualities superior to ordinary fodder in its green state, but can you suggest any source from which fodder enclosed in a dark pit can obtain these superior qualities. You offer to quote authorities in support of this view, but the only one you mention is General Wilkinson, the accuracy of whose statements you say you have no reason to doubt. Now let me ask, with all due deference, what reason you have for believing in their accuracy? The statements are themselves, to quote your own words, "almost too much for one's credulity," and as such no sensible man would believe them, unless he were sure that the General had not been misled by deceptive appearance or some other cause. First, as regards weight, the facts on which the General relies are that two cows which were fed on ensilage (amount not stated) for 28 days after they had been kept for a similar time on grass (amount not stated) increased in weight 39 pounds. Now unless we know the amounts of grass and ensilage given, it is impossible to decide in favour of either. Again, what practical man would think of using cows giving milk when trying an experiment to show that one kind of food is more nutritious than another? I believe that some Commissariat bullocks were fed on the General's ensilage. What is the opinion of the officers in charge of these bullocks as to the value of ensilage *vs.* green fodder? Now, as to the yield of milk, the fact that amounts of food are not given, vitiates these experiments. Indeed, the General himself seems to disbelieve in the accuracy of this experiment, for in his letter to Government, dated 28th May 1885, page 14, he says: "With this universal (but variable) daily decrease of yield, it has been found impossible to tabulate the advantage gained by the use of silage, for increasing the yield of milk." Lastly, as to the quality of the milk, the General starts with the misconception that the milk of cows get poorer as their calves get older, but the reverse is the case, the quality improving as the quantity decreases. Then he tests for cream with a milk-tester only. Without a creamometer such experiments are valueless; for skim milk properly adulterated with water will have the same specific gravity as milk rich in cream. I could give other instances to show that experiments made by General Wilkinson should be received with caution; and certainly where the results are almost incredible, and opposed to the views of all scientific men, they ought not to be treated as demonstrated facts.

I still hold that the superiority of ensilage has not been abundantly proved, and as long as certain butchers and dairy men in England object to receive the produce of cattle fed on ensilage, I think your readers will agree in thinking that practical men are not in this case opposed to science.

Apologizing for the length of this letter, I am Yours, &c.,

D. ALLEN.

Camp Arrah, August 10, 1885.

Note.—We hope to take up the subject in continuation in our next. —Ed.,—*I. A.*

TOBACCO CURING.

TO THE EDITOR.

Sir,—I learn that tobacco of very superior quality is manufactured at Poosah. I therefore beg to suggest that two students should be nominated from each division by the Commissioner to learn the art of curing tobacco, to be apprenticed there on the condition *that none shall be selected who, or whose parents do not own a cultivation of more than* 20 *biggahs*, and that the selected students should get 12 Rupees a month for two years if they have passed Minor Scholarship, Vernacular Scholarship, or Entrance examinations; and 8 Rupees if they have no such qualification.

S. DATTA,
Mowbhunj.

Editorial Notes.

A German paper says that forty parts of paper pulp, ten parts of water, one part of gelatine, and one part of bichromate of potash, with ten parts of phosphorescent powder, will make a paper which will shine in the dark, and which will be suitable for labels, signs, &c.

⁂

The quantity of Tea exported from China and Japan to Great Britain from the opening of the season to the 16th of July was 59,103,131lbs., as compared with 64,128,479lbs. exported in the corresponding period of last year. The exports to the United States and Canada during the same period were 14,538,657lbs. as against 16,812,468lbs.

⁂

We believe that many of our readers are not aware of the many uses to which cocoanut fibre can be brought. Among others, it has been found most useful in planting coffee and tea seedlings. A correspondent, who has tried the experiment, says that not only is the fibre a very good protection for the tender rootlets of these plants, but that it acts as a capital manure. Tea and Coffee planters should take note of this.

⁂

We are informed that a horticulture show, which was held at the Lall Bagh at Bangalore in the afternoon of the 13th instant, was a great success It is stated that the flowers and fruits exhibited were the best that have been shewn for years past. This speaks much for the enterprise of the management of this garden, and of the exhibitors, when it is remembered that a severe drought and water-famine have been experienced at Bangalore this year.

⁂

The total receipts from the four sales of Bengal opium and four months' duty on opium exported from Bombay were Rs. 2,77,35,105, which was Rs. 5,85,105 better than the estimate. The receipts from Bengal opium were for the first time for some years worse than the estimate by Rs. 4,32,095, whilst those from Bombay were Rs. 10,17,200 above the estimate. The great deficiency in the Bengal receipts occurred at the July sale, when they were no less than Rs. 1,17,045 below the estimate

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The total exports of tea from Calcutta from the 1st of May to the 31st of July amount to 9,962,193lbs. the quantity for the two preceding years being 7,516,488lbs. and 6,347,792lbs. respectively. In July, as compared with those of July, 1884, the exports to England showed an increase of 178,883lbs. while those to Australia advanced 7,280lbs. and those to America 2,213lbs. The improvement has extended to the Ceylon trade, which has advanced to the extent of nearly two million pounds in the past three years.

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We learn that the Government of India has received a report from Dr. Hallan on the results of his visit to Dr. Pasteur's Laboratory in Paris, and his observations on the method of cattle vaccination pursued by the French Professor. It has been suggested that some of the Veterinary Officers sent out to India should undergo a special course of training in institutions devoted to the study and culture of disease germs; and there is a proposal for the establishment of a laboratory in connection with the Lahore Veterinary School.

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The latest London advices concerning Tea are for the week ending 23rd July, when Messrs. Lloyd and Carter write as follows:—

> Further arrivals of new season's tea have been offered during the week, and have sold generally at a decline on previous quotations.
>
> Thin Darjeelings are 1*d.* to 2*d.* easier, but good Teas of all grades from this district have been well competed for. Cachars and Assams generally are poor, and low prices have been realized.
>
> Rates ruling for old teas are unchanged, but the demand is not brisk, country trade being unusually quiet.

In another column will be found three reports on silos in Burmah, from which it would appear that this method of storing fodder has not been productive of satisfactory results. As far as we can make out, its disadvantages lie on the side of expense; but, as the papers are descriptive enough, there seems no necessity for noticing them at length here. Suffice to say that, for the present, no more such experiments will be undertaken at the public expense.

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Elsewhere will be found an account of an influential meeting held at Chinsurah on the 16th instant, when it was decided to hold an exhibition of agricultural produce and implements next cold season. It cannot be doubted that such exhibitions are calculated to have the best possible effects, and much credit is due to the public-spirited zemindars and residents of Hooghly for their efforts in this direction. We hope they will receive all the support their energy deserves, and that they will be able to carry their scheme to a successful issue. We shall be glad to hear, from time to time, of the progress of the project.

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The *Builder*, referring to the rotting of timber, makes the following remark, which should be noted :—" The *Merulius lacrymans* is the common wood fungus that destroys nine-tenths of the wood with which we are acquainted. The reason of it being common to new buildings and not to old, is that moisture, one of the constituents, of its existence, is more present in new green buildings than in old dry seasoned ones. The two prime conditions of its existence are moisture and heat; if moisture is present without heat it will not grow, and hence its depredations in the winter time are unknown. If heat is present without moisture, it will not grow, and hence ventilation for the passage of a current of dry air will prove fatal to its existence.

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We regret to learn that the prospects of a harvest in Southern Russia are unfavourable. A South Russian paper says :—" The heat is at present almost unbearable. For months not a drop of rain has fallen. Everything looks yellow and scorched, and the cattle can hardly find pasturage. Hay is enormously dear, and the price of cattle is already rising. At the end of May it was so hot that all hope of a good harvest had to be abandoned. Then there was a sudden change, and extreme heat changed for a time to extreme cold. At present the heat is again very great; all vegetation is burnt and dried up, and the woods or gardens which have not been altogether spoiled by the heat are devastated by innumerable caterpillars." This applies primarily to the Crimea, but it is to be feared it is true of a larger area.

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Kuhlow's, writing on the fruit harvest in the Rhine District, says :—" The flowering of the vine is now over, and it has, on the whole, been very satisfactory, though there was towards the end unfavourable weather. The young plants are coming on capitally at present. The old vines are also progressing well, so that the position of affairs gives general satisfaction. No noteworthy damage has been done in the fields or vineyards, but the cherry harvest has been injured. On the 3rd instant, 11 and 12 Pf. was paid per pound, but in consequence of the wetness the cherries have in great part burst, and now only 7, 8, and 9 Pf. is paid. The walnut trees are well laden with fruit, but no little injury has been done to it. Of pears and all kinds of stone fruits there is a large quantity. On the whole, there is no need to be discontented with the harvest prospects."

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The following is a summary of the harvest crop in Germany according to a German contemporary :—" Offic[illegible] reports are published concerning the prospects of the harvest throughout the whole country. Wheat as well as summer fruits and especially hoed crops have more or less improved everywhere, but rye did not gain by the late rains, as the time of its growth was passed. The chief producing provinces, Prussia, Posen, Pomerania, Silesia, and Brandenburg, complain,—particularly in light soils—of the small crops, and as these possess the largest area of rye the heavier crops elsewhere can but poorly compensate. Hanover, Hesse, Nassau, Westphalia, and Rhineland report a good yield, and in Saxony and Schleswig-Holstein a yield of rye below consumption is apprehended. The rye harvest on the whole promises to be under the average. The first rye of the harvest was brought to market in Berlin a day or two ago, being bought at 162 Marks per 1,000 kg. The quality was very good."

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The following, which we extract from the *Farmers' Review*, is not cheerful reading :—" Prof. Riley, Entomologist for the Department of Agriculture, announces that this year we shall have two distinct species of locusts, the seventeen and seven year locusts. It has been two hundred years since these two kinds have appeared in the same season. Neither are destructive to crops; their chief injury is to trees by depositing their eggs in the tender twigs of the new growth, which cause the portion beyond the egg deposit to die. The Hessian fly and chinch bug is reported as at work this spring in the wheat in those districts where it was present last fall. These are the new crop hatched from the eggs deposited on the plant last fall. There is no remedy for them now or nothing which can be done to prevent their damage to the wheat. Grasshoppers are already reported at work in Texas, and the bark louse is present in unusual numbers upon fruit and shade trees in wide districts of the country. Altogether we are likely to have a *buggy* season."

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It will surprise tobacco smokers to know that, according to Mr. Crowe, British Consul in Cuba, cigars suited to the taste of the British smoker, are very difficult to obtain in Havannah. Mr. Crowe allows that there is plenty of " dark powerful tobacco" of fine quality, at moderate, though by no means low, rates. But if a smoker desires a light leaf, with aroma, such as the " educated palates of an Englishman" seek, he must be prepared to pay for it. Only about ten per cent. of the tobacco harvest of Cuba can be classed as of this quality; and, apart from the cost of the raw material, the best makers of the best cigars obtain wages which alone would render their handiwork of value. As much as 40 dollars in gold are paid in skilled labourers for turning out 1,000 " first-class goods." This means that a cigar of this grade costs two pence for the mere rolling, apart from the boxing, the price of the tobacco, the freight, the Custom-house duty, the interest on the capital expended, or the profits of the two or three middlemen before it gets between the lips of the European consumer.

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The statistics of the home paper trade, for the month of May 1885, are as follows :—The exports of stationery for the month of May this year amounted in value to only £64,520, as compared with £71,860 in the corresponding month of last year, and during the five months the value was £316,559, against £332,608 in the like period of 1884. The exports of paper for May amounted to 70,057cwt., value at £138,690, against 61,718cwt., valued at £132,151 in May 1884. The export figures for the first five months of the year show that the quantity of paper exported during that period has been 338,393cwt., valued at £699,838, as compared with 303,145cwt., valued at £656,459 in 1884. The sum of £500.000 out of the current year's exports represents the value of writing and printing paper and envelopes which have been shipped to Colonial and Continental ports. The imports for May amount to 107,165cwt., valued at £104,784, against 119,252cwt., valued at £112,597, in May 1884. In the five months the respective totals are 534,656cwt., valued at £506,036 in 1885, and 581,498cwt., valued at £556,104 in 1884. In each case allowance is made for the re-exports of the foreign-made product.

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The following, which we take from the *Lumber World*, illustrates a curious superstition which prevailed among the early American settlers :—Abram Reed, a farmer, living in Beaver township, Pa., cut down a large oak tree on his farm, and in cutting it up he found, imbedded in the trunk, seven or eight feet from the ground, a small glass bottle, and what had the appearance of a lock of hair. The bottle had been inserted in a hole in the tree made by an auger, then a pine plug was driven into the hole over the bottle, the hair also being held in the hole by the plug. The bottle was corked, and contained a colourless liquid. Over the plug had grown six solid rings of wood, besides a thick bark. There was a superstition among the early settlers, and it is held by many of their descendants, that asthma and other affections could be cured by the victim standing against the tree, and having a lock of his hair plugged in it while the hair was still attached to his head. It must then be cut off close to his head, and the afflicted person must walk away without looking at it, or ever passing by the tree again. While the use of a bottle was not included in this treatment, it is believed that the one with the hair discovered in the heart of the oak tree was put there in the early days of the settlement by some believer in the superstition to cure an ailment of some kind.

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WE see that the Royal Commission of the Indian and Colonial Exhibition has decided to provide accommodation at this Exhibition for paintings, water-colours, and drawings by artists and amateurs resident in India, and will defray the cost of packing and freight from Bombay to London of selections that, after inspection at Bombay, may be deemed of sufficient interest or merit to send. The paintings and drawings must be neither framed nor glazed, as it is intended to economise the cost of packing and freight as much as possible. The latest date for receiving paintings and drawings will be November 30, and they must be sent to Messrs. King, King & Co., Bombay, with particulars and name of exhibitor, subject of picture, and value. Mr. J. D. Griffiths, Superintendent, School of Art, Bombay, will inspect all paintings, water-colours, and drawings despatched to the firm. The Royal Commission does not undertake any risk, and exhibitors will have to make their own arrangements as to insurance. The framing will be done in London by Messrs. Henry S. King & Co., and full particulars of cost, &c., can be obtained from Messrs. King, King & Co., Bombay, and Messrs. King, Hamilton & Co., Calcutta.

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AMERICA is rousing herself in regard to her silk industry; for, from a paragraph in the last number of the *Farmers' Review* to hand, we find that Mr. C. V. Riley, Entomologist for the Department of Agriculture, is sending out a circular for the information of silk culturists, stating that during the coming summer the Department of Agriculture will purchase such quantities of silkworm eggs as may be deemed necessary for the proposed distribution to be made in 1886. So far as practicable, the eggs will be purchased of American producers, but under certain precautions which are as follows:—Eggs of improved races only (preferably of the French or Italian yellow races) will be bought; producers should send one or two samples of pierced cocoons with eggs; the egg-producing worms must be in perfect health; there must be no indication of the disease called *flacheri*; if the worms have all the indications of health until the spinning period, then the cocoons may be used for the production of eggs. These eggs will be paid for at the rate of $2·50 per ounce of 25 grams (about 6·7 of an ounce avoirdupois), and those desiring to raise eggs for the purpose will receive full instructions from the circular No. 9 which may be had on application to the Entomologist, United States Department of Agriculture Washington, D. C. Silk culturists are advised not to attempt the production of eggs, unless they are adepts at the industry, and have had at least one season's experience. They should also send a sample and statement of the quantity offered for sale.

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THE accounts from the indigo districts in Bengal still continue unfavourable, and the plant remains small and backward through too much rain and absence of sunshine. This is specially the case in Jessore and Midnapore, and the outturn in both these districts is expected to be small. In Kishnaghur matters are a little better, and in Moorshedabad the prospects are fair, and produce has been good. But even in these two districts more fine weather is required to bring on the plant. Purneah was at one time doing fairly well, but latterly prospects have been seriously affected by the rising of the river, which has swamped the plant at some factories. The accounts from Behar are on the whole rather better, as the weather has been generally favourable, but accounts from the different factories vary considerably, the result of the vat produce being fairly good, whilst the biga produce is small. *Moorhun mahi* will close about the end of the month, but though the prospects of the *khoonties* has been somewhat improved by the late rain, there is not much chance of a good return, owing to the lateness of the season. Manufacture is just commencing in the Benares district, where in some parts there has been too much rain, and the area under cultivation is less than that of last year. Throughout the North-West generally, and especially in the Alighur and Bulandshahr districts, considerable damage has been done by the late, heavy rain and floods, and the outturn generally will be less than was anticipated.

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THE present number of the "Records of the Geological Survey of India," being Vol. XVIII, Part 3, for 1885, maintains the reputation of that periodical, both as a valuable record of work done in India, and as an interesting expositor of geology and the kindred sciences generally. The contents of the August number are of an unusually varied character, and to most persons will possess special interest in consequence of the two papers on earthquakes. Mr. R. D. OLDHAM leads off with 11 pages of "Notes on the Geology of the Andaman Islands," to which is prefixed a coloured geological map. These islands consist mainly of eocene and miocene rocks, with intrusive volcanic rocks, mostly diorite and serpentine, occurring here and there. Mr. R. LYDEKKER follows next with a brief palæontological Note, the chief interest of which lies in his announcement of the identification of two fossils in the British Museum, formerly discovered by Dr. FALCONER, which belong of right to the Indian Museum, and which are accordingly to be transferred to the latter institution. Then follow two papers by Mr. H. B. MEDLICOTT, the head of the Survey, written in his admirably lucid and vigorous style: the first on "Percolation as affected by currents," and the second on "The Pirthalla and Chandpur Meteorites." Next comes a paper on "Coal and Oilwells in Burmah," by Mr. R. ROMANIS; followed by another on "Antimony Deposits in Moulmein," by Mr. W. R. CHIPER. Two papers on the Cashmere and Calcutta Earthquakes, by Mr. JONES and by Mr. MEDLICOTT, respectively, close this interesting number of the records.

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OUR readers will recollect that some little time back, we noticed the cultivation of the mahogany tree in the Madras Presidency, and that the Government had made an application to the Governor of Jamaica for a fresh supply of seeds. We now learn that the Governor of Jamaica has informed the Madras Government that a supply of seeds had been despatched on the 10th May last to the Royal Gardens, Kew, for transmission in the usual manner to the Government of India and the several Presidencies. We fail to see the expediency of this round-about course, thus subjecting the seeds to two sea voyages. It has been found by experience that a sea voyage affects the vitality of mahogany seeds; and if it is intended to obtain satisfactory results from sowing of these imported seeds, we fear disappointment only may be expected under the circumstances. Why the seeds could not, in the first instance, be sent direct to India, instead of being sent all the way to England, and then back again to India, is what puzzles us. There might, we think, in this instance at least, have been a departure from red-tapeism with advantage. The seeds left Jamaica on the 10th May last, and the Madras Government "Order' on the subjected is dated 16th July. There is no mention of the seeds having been received up to that date, and they will perhaps not be received for two or three months to come, when the season for sowing may have passed away.

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WE learn from a contemporary that the Assistant Director of Agriculture in Burmah, about this time last year, in reply to some inquiries from the Military Department with reference to the fodder supplies of Burmah, recommended the cultivation of crab grass. He has just published a report on the system of cultivation then recommended, which was adopted this season at the Kyauktan farm, and gave an outturn of nine tons per acre for the first cutting in July, whilst another cutting can be made in October. The first cutting can either be used as green fodder or preserved in a silo, whilst the October cutting can also be cured as dry hay. The hay that was made last October kept in excellent condition until the rains commenced this year. This grass is but little valued in India, whilst in America it is much valued as a hay crop, and is still more valuable in Burmah, as it gives twice the amount of grain and also an extra cutting.* In Burmah it grows to the height of about three feet, and horses and cattle of every kind eat it with great relish, and will remain in good condition if fed on it without any other grain. Its cultivation appears to be very simple, as the land only requires to be ploughed twice at the beginning of the rains with a turn plough, and then harrowed twice with a triangular harrow, when the grass will germinate of its own accord.

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IN another column we print a few practical suggestions from "An Amateur Gardener," to which we direct the attention of the Agri-Horticultural Society of India. We cannot help thinking that the rate of subscription fixed by the Society for ordinary members is rather high. We believe that the present rates were fixed many years ago when horticulture was in its infancy so far as India is concerned, and the conditions for importing European and American seeds were different. Many changes have taken place since then; what at that time cost 5 rupees, can now be had for very nearly half that price. Again, it must be remembered that very keen competition exists between the several seedsmen, and there are at present greater facilities offered for the importation of seeds and plants than presented themselves, say 15 or 20 years ago. It is therefore only reasonable that the Agri-Horticultural Society should keep 'touch' with the exigencies of the times. We have no doubt that, were the Society to reduce its rates of subscription, there would be a corresponding increase in the number of subscribers; and by the rule of "small profit and quick returns," there is every reason to believe that, whatever loss it might suffer at the commencement, would be amply recouped by a large addition of members, and an increased popularity. Much competition may soon be expected in the supply of English and American flower and vegetable seeds in India. Some of the largest seedsmen in England and the Continent have established agencies here for the sale of their seeds, and only recently David Landreth and Sons of Philadelphia have opened an agency for their seeds in this city. It will naturally follow that if better value can be had for their money at these agencies, people will not pay Rs. 32 annually, with an entrance fee of Rs. 8, to become members of the Agri-Horticultural Society of India, which may lose by this means many of its ordinary members. We are therefore inclined to think that, for the reasons advanced by our correspondent, the reduction in the rates of subscription suggested by him might with advantage be adopted. The suggestion for the creation of a fourth class of subscribers, seems a good one, and we commend it to the favourable consideration of the Society.

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THE following extraordinary *canard* appears in the *Englishman*, under the head of "Notes and Queries:"—

> It was formerly the case that the journal known as the *Indian Agriculturist* was maintained by a Government subsidy of Rs. 60,000 per annum. Government subscribed for 5,000 copies. Can any one tell me if this subsidy is continued? Or did it fall among the first fruits of retrenchment? It will be news to the public that such a journal exists; and it will be interesting to know whether Government is wasting public money in this way when it is grasping at the petty cash balances of Municipal Boards and Road Cess Committees.

The *Indian Agriculturist* receives no subsidy whatever from the Government. Many years ago the journal was started by ourselves as a focus in which might be gathered together whatever essays, or notices, of any interest or importance, on the ordinary agriculture of the country, might appear in the various local *Gazettes of India* or in our newspapers. It was originally started as the *Agricultural Gazette of India* in 1869. Upon its unwise suppression in 1875 by Lord NORTHBROOK, an effort was made by Sir RICHARD TEMPLE to substitute an official *Statistical Reporter* in its room. This publication was brought out by the Bengal Secretariat, but proved to be so costly, and was moreover so ill-conceived, that it was abandoned after a year or two's publication, during which the cost of it ran up we believe to more than Rs. 1,00,000. The idea of the *Indian Agriculturist* is unique, and is most valuable, although it has never been appreciated properly by the Government. The attention given by Mr. KNIGHT to the 'settlement reports' of the country, early convinced him of the need there was of some publication in which should be recorded for reference, every important experiment, or essay, upon improving *the ordinary agriculture of the country*. Lord MAYO saw the desirableness of such a record, but none of his successors have taken any interest therein. We have continued its publication from a conviction of the need of such a journal, and in the hope that at some time or other, its importance and its value would be appreciated. At this moment, the 16 or 17 volumes which have been produced since the year 1869, are of unique value. As to this nonsense in the *Englishman* about a subsidy, the aggregate subscriptions of all the various Governments of the country are so trifling, that we continue the publication only from a sense of its value as a record. Had the Government but spent upon it one-twentieth part of the money it squandered upon its own *Statistical Reporter*, we should long since have made the paper a semi-official gazette of the highest value.

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THE following notes, which we take from a contemporary, sums up the results of the measures taken by the Western Presidency to hit upon the most economical, and at the same time the best method of raising water for irrigation purposes:—The Bombay Government have recently published some very practical and interesting papers on the subject of cheapening the construction of wells, and on the most economical method of raising water for irrigation. Leaving out of the question the possibilities of the Artesian well, the conclusions arrived at in the papers now before us are that in the Bombay Presidency there are "no peculiar difficulties calling for science in any shape to overcome, and that with regard to economy in construction the cultivators are conversant with, and do make use of, when necessary, a very cheap system of well-making which it is impossible to improve upon." As to the best means of raising water for irrigation, after a comparison of several methods, native and European, a verdict is given in favour of the old leather-bag contrivance known as the *mote*. It is simple, easily repaired, brings up a good supply of water, and only requires one man and a pair of bullocks. The more intricate Persian wheel never raises anything like the quantity of water it ought to do, when worked by bullock-power, and it is not considered a sufficiently perfect machine to be placed in serious competition economically with a *mote*. As regard the other methods, the Burgess bucket lift, which may be described as a perfect Persian wheel, requires a very strong pair of animals to work it; and if the necessary charges are taken into account, there would be a final deficit of Rs. 79 at the end of the year. Hartford's windmill, or Californian pump, worked under the most favourable circumstances, showed a deficit of Rs. 57 on the year's operations. Lastly, a comparison is made with a steam pump, used in Baroda for raising water for the public park. The machine cost Rs. 5,000. It is found that the fuel and working expense of this steam pump, without including the usual charges for interest, &c., made the cost of raising water by it exactly equal to that of raising it by bullocks with the leathern bag. There is nothing like leather, and until a small machine can be invented suitable for irrigating about one acre per day, and for lifts of various heights up to 60 feet, the *mote* will continue to be the popular method of raising water. The pious Virgil probably had in mind the fact that agricultural machines to be popular must be cheap and suitable to small holdings, when he wrote, "*[illegible] ipse colendi Haud facilem esse viam voluit.*"

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THERE is nothing like open competition to arrive at the best method of accomplishing anything, which by individual effort has so far proved a failure; and this has been recognised even in the case of the utilization of the urine of house-fed animals as a liquid manure, for we learn that the Directors of the Highland and Agricultural Society, having had their attention drawn to the subject of the utilisation of the urine of house-fed animals, found that on many farms, especially in dairy-farming districts, this substance is allowed to go to waste, as its use is said to be unprofitable owing to the heavy cost of handling it in its natural state. They have therefore resolved to offer a prize of £400 to any one who shall discover a practicable method by which the valuable constituents of urine may be most profitably utilised. Their offer is subject to the following conditions:—

1. The method must be capable of being adopted by farmers on their own farms.

2. It must be sufficiently moderate in cost to bring it within the reach of tenants of small holdings.

3. It must be sufficiently simple to be understood and carried out by farm labourers of the ordinary class.

4. It should be applicable to all classes of farms, including dairy farms where no litter is used.

5. The expense of the process must be so small as to leave a nett profit of at least one-third of the total value of the urine operated upon.

6. The success of the method must be proved to the satisfaction of the directors, who shall have the sole power of judging or appointing judges, by means of such practical tests as they may deem necessary.

7. In the event of a method being discovered which the directors consider to be feasible, they are willing to contribute liberally towards defraying the expense involved in putting it to a satisfactory test.

8. The communications of all candidates for this prize shall be considered strictly private, but the successful candidate shall be required to relinquish all personal or patent right to his method, which shall become public property on his receiving the prize.

9. Full particulars regarding the methods of competitors must be lodged with the Secretary of the Society on or before 1st January 1887.

Should no method be discovered which has all the qualifications requisite for attaining the prize, the Directors may still award a prize of less value to anyone whose method has the merit of fulfilling some of the conditions, if they consider that it marks a distinct advance and improvement for the good of agriculture.

It is curious that out here no such inducements are held out for any special purposes, except in very exceptional cases, and the reward offered is anything but liberal. Take, for example, the case of the fibre-cleaning machine. The reward was Rs. 2,000 (£200). The efforts of the Bombay Government in the direction of improving the methods of raising water for irrigation purposes, have ended in smoke, and the matter stands just where it was before. By the offer of a reward for a machine, with the necessary conditions, some satisfactory results might have been obtained. This is a suggestion which we commend to the consideration of the Bombay Government.

THE AGRI-HORTICULTURAL SOCIETY, PUNJAB.

THE ***Englishman***, in its issue of the 11th instant, has reviewed the work of the Punjab Agri-Horticultural Society during the year 1884. This is what he says:—

"The public gardens of Lahore are among the finest in India, and the Agri-Horticultural Committee are to be congratulated on the improvement which they have been able to effect in the general appearance of "Dustypore" of late years. The income of the gardens last year was Rs. 13,763, and of this sum the sales of garden produce represented Rs. 7,649: subscriptions, Rs. 4,184; and the Municipal grant, Rs. 1,542. Judging from the difficulty experienced in getting the last named sum granted this year, it would seem that local self-government does not regard with a kindly eye the improvement and adornment of the town." So far we entirely agree with our contemporary: but the following is such a characteristic effusion, that we quote it *in extenso*:—

'On the other hand, there is a decided advance in the sale of garden produce, which is not, perhaps, a matter for such unmixed congratulation as the Committee seem to imagine. Apart from the oddity of the Government associating itself with a thriving business in seeds and plants, there arises the question of private enterprise. It is all very well for the Committee to pride themselves on having reduced the price of fruit trees 14 per cent and of roses 11 per cent. But what about the private dealers in fruit trees and roses? There can be no doubt that the committee mean business. "The nurseries have been cleared of overgrown plants, land has been levelled and cleared, and the operations have resulted in a great improvement in the appearance of the gardens, and in the acquisition of more space for the propagation of fruit trees and for agricultural improvements. This is news which will hardly raise the spirits of 'the trade,' although it may please the people of Lahore. It cannot be denied that there is something at once unfair and undignified in the connexion of Government with a gardening concern—even if it can be described in the language of advertisement as "a good going concern." A State-aided Sutton's establishment would doubtless be hotly resented by those immediately concerned, and would be justly and generally condemned by the public. And yet the Punjab Government directly countenances a powerful rival of the various seed firms which are making an active effort to extend their business in India. The fact is that the policy which the Government is never tired of preaching is only intended in a Pickwickian sense. The Government reserves to itself the right of violating its own rules at every turn, and the private interest is sadly to be pitied that comes into coalition with Government rivalry."

We fail to see how the Government can be said to be associated in this "Gardening concern." True, the Municipality makes a small grant towards the funds of the society, but that is only in the interests of the people who reside within Municipal limits, and who enjoy the pleasure of using the Society's gardens, and make a convenience of the place. The Society is supported entirely by private enterprise, and we cannot understand how the existence of these gardens comes into conflict with private enterprise in the sale of seeds and plants. A Municipal fund is not an Imperial one, but a local cess-fund, collected from the people of any town, and utilized for the benefit of the rate-payers. And if the tax-payers do not object to the application of a portion of their money for the purposes of a garden, nobody else has a right to object. The Agri-Horticultural Garden at Lahore is *not* a Government institution, nor is it Government aided. The Society is a private one, and the several Societies scattered about India have done an incalculable amount of good in the distribution of plants and seeds—in many cases gratuitously—and in providing fruits and vegetables of a superior kind to the people generally. This is not all; they have encouraged and spread a desire for high class horticulture and agriculture, and improved the quality of cultivation generally in India by example. They have been the pioneers of Agri-Horticulture in India, and as such, deserve all the praise and encouragement they have received. There is a genuine Government garden at Lahore (and in many other stations for that matter) known as the "Anarkullee" garden, where, we believe, no plants and seeds are sold. But even supposing for a moment that a charge was made for plants and seeds in this garden, it is not to be expected that any one would think of getting them *free of charge!* An establishment has to be maintained and paid for, and if the garden earns a small income by such sales, it does not go to show that the institution is opposed to private enterprise. Its real and only object is to provide a place of pleasant recreation for the people.

There is something ludicrous in the analogy drawn between the horticultural gardens at Lahore and "a State-aided Sutton's establishment." We do not think our contemporary knew very well what he was writing about. The Society are to be congratulated upon the reduction they have been able to effect in the prices of plants; and have set an example in this direction to the other Societies in India. We hope ere long to hear that they have also reduced their rates of subscription for members. In this connection we direct attention to our observations elsewhere. The remark that "the Punjab Government directly countenances a powerful rival of the various seed firms which are making an active effort to extend their business in India," would never have been written had our contemporary been sufficiently informed upon the subject which he attempts to deal with so summarily. It may be news to him to learn that the several Agri-Horticultural Societies in India are the *largest customers the "various seed firms" have in India.* A reference to any of the Societies (or to the seedsmen themselves) will convince him of the accuracy of this statement. As a matter of fact, the several Societies import large quantities of seeds from Europe and America for distribution to the hundreds of members who annually subscribe a certain fixed sum to the Societies. We are not concerned in defending the policy of the Government in the matter of its opposition to private enterprise, which our contemporary characterises as "Pickwickian," but we draw the line at Agri-Horticultural Societies, which we cannot regard as State-aided institutions in the strict sense of the term. They simply receive small sums from local funds, and nothing more, for which they render very often valuable aid to Government in its efforts to extend Agricultural knowledge among the people of India.

MINING INDUSTRIES IN BURMAH.

THE Administration Report for 1883-84 shows that of late years much attention has been paid to the development of the mineral resources of the Province. The various mining operations undertaken in different parts of British Burmah include *coal* working near Okpo in the Henzada District, and *coal* explorations near Thayetmayo; *earth oil* works in the K[illegible]datpu district; *lead* mining in Tenasserin; and *tin* mining in the Mergui districts. In regard to *coal*, the experimental mining commenced by Government with convict labour in the Okpo township near Kywesin village on the Aracan Yoma, proved a failure, the works having to be abandoned in consequence of the unhealthiness of the locality. It is feared that, for many years to come, it will not be possible to bring this *coal* to market at a remunerative cost. This means that until the country shall have been opened out, and further facilities for carriage provided, there is no prospect of the *coal* in Henzada being profitably worked. This is much to be regretted in the interests of a Province, where railways are making rapid progress, and river steam navigation *is* a well established fact. In addition to the requirements of numerous rice, saw, and other mills in the country, mineral fuel is needed for a commercial marine steam tonnage aggregating 335,279 tons per annum. The prospect of better results in regard to indigenous *coal* at Thayetmayo is therefore hailed with satisfaction by the Provincial authorities, who have granted a concession to private enterprise in this district, where there is reasonable prospect of success. The preliminary operations show that the quality of the out-turn is good, and encourage a hope of the quantity being commensurate with payable results. *Earth-oil* is, in reality, the only well-developed mineral industry in the country, but we regret to find its progress not all that could be desired, the works being carried on with indifferent success. Notwithstanding the fact that there are three European Companies, besides natives, at present engaged in extracting oil in the Kyoukpyu district, up to the present time no large yield of oil has been obtained. The total out-put of the whole field was 400,325 gallons. So far nothing has been discovered in the Kyoukpyu field that can approach oil-bearing strata of the type of the good American or Caspian field. Hence the business of oil-mining on a large scale in British Burmah has not been a success. The Arakanese (native) workers, who put down their wells and manage their proceedings more economically than the English firms, can alone be said to work the oil profitably. We are not surprised at this result, for mining generally in the East, when conducted by expensive agency, and where indigenous resources are neglected or not known, has as a general rule come to grief. The descriptive account of the chief oil source of Upper Burmah, given by the Government Chemical Examiner, contains nothing new or different from what may be obtained from Dr. Balfour's *Cyclopædia.* In treading stale ground Dr. Romanis follows old paths in a known domain. Mr. Law's *lead*-mining enterprise in the Salween is not as yet an assured success. The presence of *galena* in this part of the province, though for a long time known, did not attract attention for the purpose of working till lately, when the lease of a large tract of hill country at Titawlo in the Kadaingti circle was granted by Government under favorable auspices, but owing to drawbacks from want of labour and carriage, the result has not been all that could be desired. *Galena*, containing a high percentage of silver ore, is likewise found in the Karen Hills sub-division of the Toungoo district, whence the annual out-turn is about 50 tons. *Lead* is also found in the island of Maingay; and both *lead* and *antimony* are found in the Amherst district. All these localities are in the Tenasserim division. With great capabilities, the *tin* industry is languishing in Mergui in sad contrast with the prosperity of the Malayan and other fields further south. This ought not to be; and it is satisfactory to find that it is proposed to make a thorough inquiry into the subject of placing *tin* working in Mergui on a better and more reliable footing. *Iron* is found in Shwegyin, but not worked. *Gold* is obtained in the same district from placer washings, the "pay-dirt" being obtained from the bed of the Thayetpindae, a stream which flows into the Shwegyin river.

From these brief notices, it will be apparent that the mining industries in Burmah are capable of great development, and we have endeavoured here to direct attention to a subject of much commercial importance. It is for the trade and the Government to take up the matter, and we hope to hear soon that advantage has been taken of the large mineral resources of Burmah.

CHINSURAH AGRICULTURAL EXHIBITION, 1886.

WE have received the following particulars of an influential public meeting of the chief residents of the Hooghly district, which was held at Chinsurah, on the 16th instant, at 6 P.M., to consider the advisability of holding an Exhibition of agricultural produce, and implements, next cold weather, at the place:—Among those present were Baboo Doorga Churn Law, C.I.E., in the chair, Mr. B Dey, C.S., Prince Amiruddin Ahmed, Moulvi Ashrafuddin Ahmed, and others interested in the subject. Before the proceedings commenced, Mr. Dey read some letters from gentlemen of the district, who were unavoidably absent from the meeting, but who expressed their entire sympathy with the proposed exhibition, and offered their hearty co-operation in the furtherance of the scheme. The chairman, while asking Baboo Onooroop Chunder Mukerjee to move the first resolution, dwelt on the necessity of having an Agricultural Exhibition, on the ground of its conferring manifold advantages on the ryots of the district. Baboo Onooroop Chunder Mukerjee then moved, "That it is desirable that an "Exhibition of cattle, agricultural implements, and products "fruits, flowers, and vegetables, and articles of manufacture, "should be held at Chinsurah in the ensuing cold weather." He delivered a speech, in which he dwelt on the benefits which are expected to result from an agricultural exhibition, and said, that although some of the principal zemindars of the place had been unable to attend the meeting, owing to inclement weather, and other causes, still, he was in a position to say, that the proposal had their fullest approval, and that they would try, by every means in their power, to further its cause. This was seconded and supported, and Baboo Eshan Chunder Mitter, Government Pleader, than delivered an address. The resolution was then moved by Baboo Joy Govind Law, "That an "Executive Committee, consisting of some of the leading residents present, be appointed, with power to add to their number to carry out the necessary arrangements, and collect "funds." This resolution was supported by Baboo Khetro Nath Dey, who said that exhibitions of this kind were not quite unknown to the country. While he was a school-boy, he remembered that exhibitions used to be held every year in Hooghly under the patronage of Mr. Russell, the then judge of the station. He also said that an exhibition of agricultural products and implements was held at Alipore in 1863, during the Lieutenant-Governorship of Sir Cecil Beadon, and the Government had then passed a resolution, authorising the expenditure of Rs. 30,000 annually on exhibitions, and that in furtherance of this resolution, exhibitions were held in Burdwan, and elsewhere. It was resolved to send circulars to all the leading zemindars and other residents of the district, requesting their help and co-operation.

A VALUABLE ONION.

Dr. E. Bonavia, who is a prolific writer on Agri-Horticultural subjects, has contributed the following letter to the *Pioneer* in which he brings to notice the existence of a valuable and prolific onion. We reproduce the letter *in extenso* for the benefit of our readers :—"I write these few lines with the hope that you may be good enough to allow them a little space in your columns, as the best means of making this vegetable widely known. Many years ago, one Fidda Hossein, a Vakeel of Lucknow, obtain some seed of this onion from Rahimabad. He gave it to Judge Fraser, and through the latter it came into my hands. I sowed it in the Lucknow Horticultural Garden, and found that it was capable of great progress. For many years afterwards, I selected the best for seed and reproduced it. When I left Lucknow, Mr. Ridley continued this good work. After coming to Etawah, I obtained some seed of this remarkable onion from Lucknow, and sowed it in the jail garden. By this time, this white onion had gone through more than 15 years of acclimatization and selection in the Lucknow gardens. The result of the sowing in Etawah showed that its pedigree was as good as ever, and that it probably was one of the finest strains of this vegetable yet raised in India. I again selected the best and finest bulbs for seed, and this year I have a fine lot of seed. A seer of seed produced 58 maunds of onions for use, besides 2 or 3 maunds kept for seed for next year. The soil was not very well prepared. This onion is sweet, mild, and very nutritious. As it is ripe at the commencement of the hot weather, when every other vegetable excepting watery pumpkins has disappeared, it is very useful for general use, but especially for soldiers, prisoners and others, for whom vegetables are most important as preventives of sickness. I remember reading in some ancient history that the Pyramids of Egypt are supposed to have been built by people who during their hard task got little else to eat but onions. It is well known that onions, even now, are one of the great vegetable products of the Nile delta. I think there can be little doubt that if the Egyptians in those days had such a fine vegetable as the present white onion of Lucknow, many more Pyramids would have probably been left for posterity to admire. This onion is very different from the bazaar onion. When boiled or otherwise cooked, it has not the rank flavour of the native onion, and is delicious in whatever way it may be dressed. A word about its cultivation. This useful bulb, by training, can be either an annual or a biennial. The former germinates from seed, grows, flowers, and seeds—*all in one season.* But in seeding the bulb is used up—and *nothing is left* ; all that remains is the seed. So that, as an annual, the onion can only be used from the time of germination to the time of showing flower. On the contrary, as a biennial, it germinates, grows, and forms a fine bulb the first year. So that it can be used both in its green state and in its dry state. The next season then the largest and finest single bulbs are selected about October and replanted in rich soil for seed. The golden rule is—for seed, always keep the strongest and finest and best shaped bulbs, and always plant in rich soil, and let water never be wanted. For, from this seed the next generation is to come. Also, for seed, keep the best and strongest heads of flower. By seeding, the onion, as I said, is used up. It will thus be seen that the biennial variety is far the more useful. I am not prepared to say whether the onion—a close relative of the lily—was, in a state of nature, annual or biennial. I am inclined to think that it was an annual, and that by cultivation a biennial variety turned up and being more useful was selected and fixed. In a field of first-year onions a small number will be observed throwing up flower stems. These should be *scrupulously* eradicated and sent to the kitchen. If left to seed, the crops will be leavened by the *annual* variety, and rendered comparatively worthless. The object of the cultivator should be to keep the onion *strictly a biennial*. To keep the bulbs from spoiling, they should, in the first instance, be well dried in a current of air, and then kept in a cool place either on shelves or on sand, one close to the other, without touching, and away from the inroads of white-ants, rats, and other enemies. The cultivation of the onion is very simple. Sow in October in beds of prepared soil with some wood or charcoal ashes. This selected seed is so good that it all germinates at once. Water regularly. Should the young plants at any time look unhealthy and yellowish from poverty of soil, give them a sprinkling of ashes, and then a watering. In a few days, as if by magic, the plants will become as green as grass. Let me mention that there are few things more delicious than *very young onions*, eaten with bread and butter. As soon as the plants are large enough to handle—say of the thickness of a pencil—they should be pricked out 6 or 8 inches apart, in good soil, and watered. The better the soil and the more regular the water, the better the onions and the larger will be the produce. In April the green leaves will wither, and the bulbs will be ripe to lift and store. I repeat that any which attempt to flower the *first* year about March or so, should be uprooted and utilized. It is a mistake to fancy that the green leaves of the onion are of no use. They are simply the choicest and most delicately flavoured part of the onion plant. For flavouring dishes, soups, gravies, salads, &c., cut up small, they are fine. But as a vegetable, of course, the bulbs are the most useful part."

Miscellaneous Items.

A rush of water came down all the local rivers in Purneah during the past week, but as yet the damage done has been inconsiderable.

We are informed that at the water-works scheme meeting in Mozufferpore, it was decided that the Municipality should draw out an estimate for the scheme, the money to be raised on debentures, interest being met from taxation. Patna may very well take a leaf out of the book of the sister city.

The general market at Bangalore is well supplied now with both vegetables and fruit. Of the latter, apples, figs, pomegranates, strawberries, and guavas are all in season, and sell at reasonable prices. The mutton stalls are tolerably well supplied, but as to the beef—why, it is a scandal to the station. The horticultural show at the Lal Bag ought to be a success.

The great heat and scorching land-winds which made Pondicherry very uncomfortable about a fortnight ago have nearly left the station, and now there is a good share of sea breeze during the greater part of the day, and frequent showers of rain. The ryots are hurrying, though very late, their sowing of the commoner kinds of edible grains, the prices of which have been rising for the last few weeks. The indications of more rain are favorable.

The Straits Settlement would appear to be no great place for growing potatoes in, for we find that local tradesmen are despatching large quantities of the tubers for shipment to Penang. Very recently about six thousand pounds were despatched by rail. At this rate potatoes will rise in price here, and it is to be hoped the Eurasian and Anglo-Indian Colonists will cast such exceptional industries as ostrich-farming and mushroom cultivation to the winds, and take to the growing of potatoes which, we can assure them, will give them a better return than the two first mentioned.

The report of the Upper Sind Horse Show, just to hand, shows the total number of animals exhibited to be 815, consisting of 411 mares, 91 fillies, 44 yearlings, 114 horses, 43 colts, 32 geldings, 12 donkeys, 20 mules, 6 cows, 11 bullocks, and 31 camels. The show, though called a horse show, was more of a show of live stock on a small scale. The increased popularity of such shows was evinced by the increased number of animals in this case. The entries in the classes of mares and fillies showed them to be in good condition and of good quality ; but the horses are alleged to be a poor lot. Owing to the momentary expectation of rain, the usual system of judging by marks was dispensed with. The number of geldings entered in all classes was only 19. Donkey stallions are reported to be doing well. But of ordinary donkeys, riding camels and horned cattle, there is not such a favourable report as to quality.

The Indian wheat trade has shown signs of improvement this year so far as the quantity exported goes. During the first quarter of the current year, nearly 204 lakhs worth of wheat was exported, against less than 157¾ lakhs duging the same months of 1885. The exports to the United Kingdom show an increase of over 56 lakhs. The exports to France and Egypt fell off; but there was a large increase in exports to Belgium, Holland and Italy. The exports of Indian tea show a considerable increase. Over 30 lakhs worth of tea was exported, during the quarter, to the United Kingdom; against less than 16 lakhs worth in the same quarter of last year.

The deaths in Bombay from cholera during the past week had decreased to eight. The summary of the season reports states that there has been slight rain in most districts; but more is wanted in parts of Sholapore, Admedunggar, Poona, Bijapore, Nasik, Khandesh and Dharwar. Young crops are withering in parts of Sholapore, Khandesh, Bijapore, and Thana, and are injured by insects in parts of Hyderabad, Upper Sind Frontier, and Bijapore. Fodder is scarce in parts of Khandesh, Sholapore, Nasik, Ahmednugger Poona, Bijapore, and Belgaum. Cholera prevails in parts of eighteen, fever and cattle-disease in parts of nine, and small-pox in parts of four districts.

Two telegrams have recently been forwarded to the Chief Engineer, Bengal, P. W. D., Irrigation Branch, by Baboo Makhundo Lall Chowdhry, Zemindar, Bahabpore, and president, Agricultural Association, that, owing to the closing of the irrigation sluices, agricultural operations, which depended upon the supply of water by the Eden Canal, have been completely stopped. The prospects, it is said are very gloomy; and if the canal is not re-opened, eighty thousand cultivators will suffer by it. Distress is already existing, and scarcity staring them in the face. The applicants are even willing to pay a proportionate cost of silt-clearing charges. The paddy plants, which have been transplanted, are withering, and the time for the operation will be closing immediately.

"C." writes to us:—"As I find from your paper that the Madras Government has ordered the stoppage of further work in connection with the Artesian well at the People's Park, upon a report from Dr. King of the uselessness of boring through the sheet of rock which has been struck, I would like to know on what grounds Dr. King assumes it impossible to strike water below or within the rock. I believe that rock and stiff clay are the most likely stratas in which springs of water exist, caused by percolation through them from higher lying strata, and it seems to me a mistake to stop short when the most likely soil in which springs abound is reached. Dr. King is a clever geologist, and stands well with the Government, but after all he may possibly err. I would recommend the boring to be continued to a further depth of 50 feet or more, before abandoning what has been begun at so great a cost."

Selections.

SILOS IN BURMA.

The following papers are published for the information of people proposing to make silos in Burmah. For transport cattle and other Government animals at places like Rangoon or Thayetmyo, economically managed, silos may be useful. But all the sanctioned experiments with silos in the districts have now been completed, and no more such experiments will be undertaken at the public expense for the present.

J. E. Bridges,
Offg. Secretary.

Memorandum by F. W. Cabaniss, Esq., Assistant Director of Agriculture, British Burmah, on Silo-pits at the Kyauktan Farm,—dated the 10th July 1885.

On the 10th July 1884, two silo-pits had been dug and were ready to be filled. The first pit was circular, five feet in diameter, and 15 feet deep. The second pit was also circular, slightly larger at the top than at the bottom, seven feet deep, and on an average of five feet in diameter.

2. Nine men started on the 10th July to cut grass near the pit, to fill it, and by the evening of the 12th the pit had been filled and the weights put on. This was pit No. 1. By the 15th July the weights had settled six feet; six feet more of earth was, therefore, placed on the top of the pit. By the 30th July it had settled 18 inches more, and earth was again piled on. After this, the weight ceased to settle. On the 9th July 1885, this pit was opened, and the contents found in perfect condition.

3. On the 21st July 1884, pit No. 2 was filled by nine men in one day, and the weights placed on it. Five days afterwards it had settled four feet, earth was piled on it, and it ceased to settle any more. On the 18th May 1885, this pit was opened, and its contents were found in good condition, with the exception of about two inches on the top and one inch around the sides, which had moulded and was black. When this silo was opened, the farm buffaloes ate the ensilage, but at the time silo No. 1 was opened, they would not touch the ensilage, from either pit, as plenty of fresh grass could be had of the same kind, of which the ensilage one year previously had been made. Horses would not eat it at any time.

4. The cost of silo No. 1 amounted to—

	Rs.	A.	P.
Cost of digging	10	0	0
Cost of filling, &c.	13	8	0
Total ...	23	8	0

This silo-pit contains food for four buffaloes for one month. The cost of employing a man to graze 12 buffaloes is Rs. 24 for one month. This shows that in this section of Burmah it will cost three times as much to keep buffaloes by feeding them from the silo as by grazing them.

5. In making the above statement, I have taken the district rates for labour, namely, for a pit five feet in diameter, Re. 1 per cubit depth; cutting grass, or a day's labour per man, eight annas per day; grazing one buffalo, Rs. 2 per month. The silo in this section of Burmah is, therefore, at present useless. This, however, may be changed in the course of time if labour becomes cheaper, and if there are less facilities for grazing cattle.

6. My experiences with silos are that they are principally useful, namely,—

(i) when it is necessary to preserve cattle-food rapidly;
(ii) when it is wished to preserve green food for a time when the soil does not produce it;
(iii) when it is cheaper to take a large quantity of cattle-food from a small area of land.

7. Thus we have in Thibet (the place where, I believe, ensilage first originated) a small area of cultivable land for a short time of the year only, so that the requirement is to save the food rapidly so as to get a second crop from the land, if possible, and also to preserve green food for a time when the soil does not produce it.

8. In America we have a large quantity of green food for cattle available in summer and none available in winter. The facilities for saving the ensilage by machinery also add to its advantages in America.

9. In India the rains might be compared to the summer of America, as it is the time of plenty, and the dry season to the winter, as it is the time of scarcity of cattle-food.

10. Cheapness of labour in India compared to relative value of land in India also takes the place of advantages of machinery in America.

11. In England and France land is valuable compared to labour, and this favours ensilage; while here, in Burmah, it is just the reverse, labour being expensive and land (for grazing) free.

12. The silos were not opened earlier because the farm cattle, as well as the cattle in the neighbourhood, were not at the farm, but away grazing during the hot months of the year. Ensilage is not valuable at any time in the Kyauktan sub-division, where the farm is situated.

13. Under the above circumstances I, therefore, recommend that no more money be expended by the Agricultural Department in experiments with silos in this section of British Burmah.

From Colonel W. C. Plant, Commissioner of the Tenasserim Division, to the Secretary to the Chief Commissioner, British Burma, Land Revenue and Agricultural Department,—No. 1416-117, dated the 22nd June 1885.

With reference to your letter No. 1412-7C., dated the 23rd June 1884, I have the honour to submit, for the information of the Chief Commissioner, copy of letter from the Deputy Commissioner, Toungoo, with enclosures, reporting on the experiments in silos in his district.

silos, to be of any advantage, should be packed in time to be fit for opening when the hot weather has set in, and fodder and straw difficult to get, say, packed in July and opened in February.

From Lieutenant-Colonel W. O. HUGHES, Deputy Commissioner, Toungoo, to the Commissioner of the Tenasserim Division,—No. 8-249 (Agri-Horticultural), dated the 11th June 1885.

IN continuation of my letter No. 5-423, dated the 31st July 1884, I have the honour to report that two silos—one at Yedashe, and the other at Oktwin—were constructed and stored with grass in December last. The silos were opened last month, and the results of the experiments, as reported by the Myooks, appear to be unsatisfactory. Copies of the reports are enclosed, as also a memorandum by the Myook of Zeyawadi in reply to a letter from this office, asking him to report how far such a system is called for in his township and appreciated by the people. In a district such as Toungoo, where there is abundance of pasture, except for two or three months in the hot weather, when straw is supplied as fodder, I am inclined to agree with the Myook that the prosecution of the experiments is unnecessary.

From MAUNG KHIN, Myook of Zeyawadi, to the Deputy Commissioner, Toungoo,—No. A, dated the 20th May 1885.

WITH reference to your memorandum No. 5 1202, dated the 24th March 1885, I beg to report on ensilage as follows :—

2. I dug in my Court compound a pit 10 feet long and 5 feet deep, sloping from 5 feet broad on the top to 4 feet broad at the bottom.

3. I got four cartloads of grass,—two of which were "doob" grass, and the other two long grass from the paddy-fields. The grass was put into the pit in December 1884. It was trodden down by men as it was put in. I closed up the pit by covering it with two mats, and placed the excavated earth over the mats.

4. I opened the silo yesterday in the presence of Burmese gentlemen, Maung Tu and Maung Gyi (members of the Rural Board). I herewith beg to send you in 5 baskets samples of the two sorts of grass that were ensilaged.

5. The top and bottom of the ensilaged was slightly decayed, but the middle portion of the same was good and sweet. I have given a good portion of this grass to the bullocks, and they have eaten it. The cost of the silo was Rs. 16-4-0, and I think the experiment has been successful.

From MAUNG PAN BYU, Myook of Thagaya, to the Deputy Commissioner, Toungoo,—No. 44, dated the 1st June 1885.

THE Thagaya Myook, Maung Pan Byu, begs to report on ensilage as directed in letter No. 8-177,—dated the 27th May 1885.

(a) The grass was put into the silo on the 9th December 1884.

(b) The silo was opened on the 9th May 1885. Some of the ensilage was like straw, some was of a green, and some of a dark colour. Cows and ponies only ate it when they had been deprived of other fodder, and even then only in small quantities.

(c) There is no use for ensilage in my township : straw is plentiful and better.

From MAUNG KHIN, Myook of Zeyawadi, to the Deputy Commissioner, Toungoo,—No. 6, dated the 7th June 1885.

IN reply to your memorandum No. 5-221R.D., on the subject of ensilage, I beg to report that I have consulted the cultivators about the ensilage. They tell me that it would be only entailing extra work on themselves if they made ensilaged grass, as they have sufficient grass for their cattle throughout the whole year, and they do not appreciate the same for their cattle, fearing the cattle will grow thin. I, therefore, do not think it desirable to continue the experiment.

From the Officiating Secretary to the Chief Commissioner, British Burmah, Land Revenue and Agricultural Department, to the Commissioner of the Tenasserim Division,—No. 1290 2C., dated the 26th July 1885.

I AM directed to acknowledge the receipt of your letter No. 1415-117, dated the 22nd ultimo, submitting reports on the experiment made in silos in the Toungoo district.

2. Two experiments were made by the Myooks of Zeyawadi and Thagaya townships respectively, and both appear to have been fairly successful in so far that the ensilage was found after five months' keeping to be palatable food for cattle. The cost of the Zeyawadi experiment is given at Rs. 16 4-0, and this appears somewhat high when compared with the amount of grass obtained. In Toungoo, and in nearly every district in Burmah, there is sufficient grass for the cattle, even during the hot months of the year ; cultivators will not, therefore, go to the expense and trouble of keeping grass by artificial means whilst their cattle can find fresh grass throughout the year. It appears, moreover, that the cultivators show the usual suspicion of any novelty, being afraid that ensilaged grass would not fatten their cattle. Under these circumstances, I am to say that ensilage experiments need not be continued in the Toungoo district.

STRAWBERRIES BY THE TON.

BY ONE WHO LIKES THEM.

IT may have been an exaggerated estimate of the value of his time for the guard in "Alice's Adventures" to declare it was worth a thousand pounds a minute, but it would be quite within the mark to say that in the fruit-growing districts just now a good shower of rain might be valued at that rate. Seldom has there been such a crop, in the southern countries at all events, of fruit of all kinds, which need but frequent showers of rain to make this one of the most prolific of seasons. Without the much needed rain, however, there will be no dearth of fruit, as the appearance of our shops and the hawkers' barrows testifies. Within the last few days strawberries of good sorts and of large size have been retailed at four pence a pound, and even at this rate there has been a large profit to the producer. Few Londoners have any idea of the extent to which this fruit is cultivated in the neighbourhood of the metropolis. A day or two since we were in a field at Baxley, from which on the morning of our visit there, had been picked and sent off before eleven o'clock two tons of strawberries. We had heard of the fruit being picked and sold by the ton, and we determined to learn more of the culture of this delicious fruit, which was produced in such quantities so near London. Having appointment with the worthy farmer we had no difficulty in finding him, for rows of pickers indicate where the fruit is being gathered. The air is redolent of strawberries, not faint, as when they are kept in a room, but fresh and luscious. Here is a field of sixteen acres, with fruit in various stages. The part of it where the pickers now are has been gone over four or five times, and still yields abundance. There are some two hundred women and children and a few men, most of them resident in the neighbourhood, but there are a few from London. At Sidcup we saw an encampment of gipsies, about a hundred, come to take part for the first time, we believe, in fruit-picking. The pickers are supplied with wicker baskets, holding 5lb., which are taken, when full, to the man who weighs them for market, and as each basket is brought in the picker gets a ticket, which represents a money value according to the crop. To-day the fruit is not large, and is being picked for jam ; the strawberries are, therefore, "strigged," or picked without the stalks ; when gathered for table they are "plummed." Fruit is worth now three-halfpence a basket for packing ; by-and-by, in the afternoon when the picking begins for the table fruit, so that it may be sent off at once to arrive fresh for the morning's market, the rate may be reduced to a penny. The pickers have been at work since six, and as has been said have gathered over two tons. As in other callings, it is the quick-fingered who excel. Very deftly do some of the pickers lift up a plant and remove the ripe fruit ; some of the girls seem as quick as any. The pickers can earn from five to three shillings a day, according to their dexterity and the fulness of the crop. Here is a boy who can earn four shillings a day ; and no wonder that schoolmasters and mistresses complain of vacant places during fruit season. At first thought one might suppose that the employment of boys and girls to pick strawberries was of doubtful expediency ; and so it might be if fresh hands were employed daily, but they soon have [illegible] enough, in most cases too much, and after the first day very few strawberries find their way to the mouth. Indeed, so confident are the growers that things will right themselves that not even a prohibition as to eating is given to the pickers when they are engaged. As a matter of fact, we observed the pickers at work, and only saw one strawberry eaten while we were in the field. The old man engaged in receiving the fruit and weighing it—a stolid old fellow who had been at this work for many years—did communicate this much, that he had not tasted one all the season. Fortunately for consumers, the cultivation of the strawberry is a profitable occupation, in spite of the shortness of the season and the exigencies of weather. This year, in this part, picking began on or about the 24th of June, and will last till the middle of July. During the season the plants to come to perfection require many hours' rain daily, with hot sunshine between. This year, in the absence of the much needed rain, many tons of unripe fruit will not ripen at all. In the spring, the large jam-makers contract to take the fruit at so much a ton. When it is likely to be scarce it may fetch £50 a ton, if the crops promise well it may be sold for £25. But even at the latter rate the industry must be a profitable one. Fresh plants are sown in November, but are not allowed to fruit until the second year; they arrive to perfection in three years, and will continue to bear well for six years. They are hardy plants, and do not require much cultivation. The ground is dug up or ploughed in the winter, and afterwards manured. In the spring straw is put underneath the plants to keep the fruit from being beaten into the earth by the rain. Few crops, we should imagine, of so prolific a character cost so little for labour to cultivate, and when the cost of picking is added there must be a handsome margin for the grower, even in an average season. Take this year, though doubtless it is more than an average one: some land will yield perhaps from two to three tons an acre; taking the fruit at so low a price as £20 a ton, and the cost of picking at three-halfpence for five pounds, which comes to £2 16*s*. an acre, there must be left a very large margin for rent, cultivation, and exigencies, and glad are we it is so, not only because the delicious fruit is so popular, but also because it affords another proof that fruit growing, to which the attention, of British farmers is so constantly urged, may be made highly remunerative.—B. C.—*Pall Mall Budget.*

THE WOBURN EXPERIMENTS,

In a lecture on 'The Practical Uses of Field Experiments, delivered at Brighton during the late show, Dr. John Voelcker, the new consulting chemist of the Royal Agricultural Society,' threw some light on the problem presented by the singular results of the Woburn trial of highly nitrogenous against poorly nitrogenous manure in a rotation of crops. Instead of appealing to some extraordinary richness of the light soil in nitrogen to account for maize meal giving as great a produce as cotton cake, Dr. Voelcker said:—'Where clover is grown after a cereal, a quantity of nitrogen is found accumulated in the surface, which becomes richer in nitrogen than it originally was. This is the crop residue. If after clover, a legume of different habit, and growing its supply of food from different sources and levels, be grown, no heavy crop can be got. More nitrogen is found to have accumulated in the soil, chiefly near the surface when the clover is seeded than when it is mown, accounting for the experience of the farmer that the wheat crop is better after seeded clover than after mown.' Dr. Voelcker found in 6 inches depth of soil after a crop of clover as much nitrogen as is equivalent to 8 cwt. per acre of Peruvian guano. It would appear, then, that after the good clover at Woburn the soil receives such an accumulation of nitrogen, that it is able to produce a maximum crop of wheat with help of the low nitrogenous food maize meal, and that the extra nitrogen of cotton cake is not required. The wheat at Woburn next year is to follow tares and peas instead of clover, to try how cotton cake and maize meal manure will act then. Still, it is not explained why one manure does not surpass the other for the roots and barley.

Sir J. B. Lawes, writing on these experiments, says:—'In 1883 two of the plots of permanent barley, which had been manured with minerals and salts of ammonia, or nitrate, each yielded over 60 bushels per acre. The total produce on the two plots, straw and corn together, averaged 7,849 lbs. The plot manured with minerals alone gave a total produce of 3,422 lbs. lbs per acre, the deduction of which leaves 4,427 lbs. as due to the nitrogenous manures. The amount supplied was 400 lbs. of salts of ammonia and 550 lbs. of nitrate of soda, each calculated to contain about 86 lbs. of nitrogen. A barley crop, as carted from the field, would contain considerably less than 1 per cent of nitrogen, and I should estimate that the 4,427 lbs of crop contained between 40 lbs. and 45 lbs. of that substance, or about half the amount supplied in the manure. But we have to bring into our calculation the unexhausted residue recovered in barley grown in the succeeding years, which amounted on an average of three years to ten bushels per acre. The nitrogen contained in these 10 bushels, including the straw, would amount to about 9 lbs., making a total of about 50 lbs. recovered out of 86 lbs. supplied. It should be stated, however, that in the corresponding wheat experiments there was little or no effect from the unexhausted residue of the manure in the first two years, but a considerable effect in the third year, after a dry winter, and doubtless little loss by drainage. If such is the case in a field under careful experiment, and where there were no weeds to rob the crop of a portion of its food, it is obvious that considerable loss must take place in the ordinary application of these manures; though it is true such heavy dressings are not employed in practical agriculture—*North British Agriculturist.*

NARCISSUS FARMING IN THE SCILLY ISLES.

Few of the seafaring folk who pass and repass the Scilly Isles on their way out and home, have any idea that the much feared rocks and islands are the seat of a large and rapidly developing floriculture. There was a time when Scilly was a name familiar to the *habitués* of Lloyd's; now it is more often heard in Covent Garden. For among the low hills of St. Mary's and Tresco, the narcissus, in all its forms and variants, blooms, and flourishes, and increases. Earlier in the salesman's hands than its Riviera rival, more pleasant in the purchaser's eyes to look upon than the Jersey lily, its progress as a flower favourite has been distinguished and triumphant. Among the farmers of the Cassiterides the narcissus has effected a social and financial transformation. Not so long ago, a man's consideration with his friends had, in some sort, a connection with the number of baskets of new potatoes he could, while spring was yet young, despatch to delight the plates of metropolitan gourmets. There still is poetry, for the island agriculturist, left in the potato, but the smile, born of hope and prospective profit, is reserved for the bulb of the narcissus. That bulb, too, is not, like the potato, massacred to make a meal for man; it is, after the flowers are cut, left in the soil to increase in productive capacity. Every bulb becomes at least two, sometimes three or four or five, in the course of the year. A little judicious replanting and separating are needed to achieve results in the way of fruitfulness and multiplication, which throw utterly into the shade the Egyptian performances of the children of Israel. Every steamer that left Scilly last spring for Penzance, in Cornwall, carried one of the fairest and most fragrant of flowers by the hundred thousand. It is sad to think that those very steamers have afterwards conveyed their myriads of mackerel—sad at least for those subtly sensitive to sweet odours. Small farmers, who own from but twenty to forty acres, have suddenly found themselves *vis-a-vis* with a most promising prospect. Incomes have risen from a hundred to six hundred a year with an alarming rapidity. Alarming! nothing but yellow fever can be compared to it. In the West Indies they conceal the malady for fear of frightening the people away. In Scilly they hide the blessing for fear the foreigner may come in and appropriate some of the loaves and fishes. Self-interest is strong everywhere, but it should not hinder the world from learning something about a beautiful industry.

It is a moot point who introduced the narcissus and the lily into Scilly. Some say Mr. Augustus Smith, and some say the Monks; for the Priory at Tresco from—we believe—the days of Athelstan to those of Henry VIII. was the abode of devout brothers of the Catholic faith. Mr. Augustus Smith was not a monk; but there are those who say that he at least recognised the peculiar susceptibility of the island soil to the blandishments of the narcissus. Perhaps, as the snake by a mysterious law of nature was banned from Ireland, the narcissus was fated to have its most fruitful and best loved home in the Cassiterides. However, the origin of the narcissus culture in the low-lying but beautiful little islands of the West may be accounted for, this fact is certain, that such varieties of the narcissus as Democlitus, Toison d'or, Soleil d'or, Louis d'or, Gloriosa, Isabella, Beselman major, Baselman minor, Czar of Muscovy, Grand Monarque, Jaune Supreme, and so on, flourish there and abound. The foam rising from the sea-crests of the Atlantic as they beat themselves to a height of two or three hundred feet against Peninnis Head, against the Pulpit

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Rock, or against Giant's Castle, is blown here and there into every nook of the island valley. Yet the narcissus does not seem to mind. The south-westers loom heavily in dark storm-clouds, and then burst in furious, gusty squalls, and the farmer goes forth to find his lily stalks a little bent perhaps, but for all that saved from all crucial harm amid the sheltering sheaves of the lily leaves. At Rocky Hill, and in some other parts of the islands, the force of the Atlantic gale is broken by the thick intersecting hedges of macrantha, which in themselves are one among the wonders and beauties of the Cassiterides. The plucking of the narcissus is not unpleasant work. The stalk breaks with a crisp noise not at all disagreeable to the senses. As a matter of fact, although we have spoken lightly of the effect of the gales, the grower is apt, through anxiety to be over-careful. He cannot bear that the bright fresh flowers should be blown about by the storm, and so have their petals bruised and shattered. He cuts them while they are yet in bud, and before Eurus and Boreas can vauntingly display their baneful power. He places them in lukewarm water, over his kitchen oven, and then the narcissus opens itself in all its simple loveliness, untarnished by the hurricane, and fit for Covent Garden. It may be asked where Scilly gets all its narcissus bulbs or lily roots from. Well, from Holland. Holland is the ancestral home of the tulip, and equally profitable has it made the culture of the narcissus. It is running over with bulbs, and these it exports to the votaries of floriculture. The Scillonians have bought from the Dutchmen, and, not content with buying, they purpose, on their own hook, setting up a bulb manufacture. They see that the gardeners of Holland make a great industry and large fortunes out of the export of roots, and they are conscious of no reason why they should not do the same. Although Scilly contains not so very many hundred acres of cultivable soil, the inhabitants hope to make the most of every yard which the Atlantic does not directly attack, and in so doing, read a lesson to other agriculturists.—*Pall Mall Gazette.*

NOTES ON TEA.

By Percy Swinburne, late of Sylhet, Cachar and Assam

Cultivation.—The young plants should remain untouched for a month after being transplanted to prevent any disturbance of their roots, and to allow them to recover from the shock. The jungle between them has now grown to such a length that if no further cultivation could be given, it would be necessary to clear it away with the *dhow.* Each man should not do less than 60 *nulls* of this work, unless from some misfortune the jungle has been allowed to grow for two or three months, when 30 *nulls* is enough. Any jungle which grows within a foot of the plant should be weeded, but if the jungle is allowed to grow too long, much damage is done to the young plant. First, the plant is weakened by closely shut in by jungle, and next when the jungle near it is pulled up by the roots, large balls of earth are removed with the jungle roots which have now taken firm hold of the ground, and the little seedling is shaken and its roots disturbed.

The best treatment is at the end of the month to hoe gently all round the young seedling, but great care must be taken. The hoe must not strike within six inches of the plant—that is, a circle of a foot in diameter must be left with the plant in the middle. The hoer stands close to the plant, and hoes over it, drawing the earth towards the plant; he then turns gradually round, repeating the operation until the circle is complete. Now he places his hoe on one side, and with his hands pulverizes the soil and draws it back from the collar of the plant. Each of the plants now stand in the centre of a hoed clean circular space of about 1½ to 2 feet diameter. The land remaining between these spaces need not be hoed until the end of the year, and the jungle on its being repeatedly chopped, with the hoe gradually dies out. This work can be done for 1½ *hazree s* for a piece of 16 bushes square, 4 by 4 feet planting, 256 bushes, 28 4/9 *nulls*; and afterwards as the work gets lighter, it can be reduced to 1¼ and 1 *hazree*. It should, however, be borne in mind that this work is much heavier in close planting than in wide. There are 270 bushes in 30 *nulls* planted 4 by 4 feet square, and only 173 in the same space planted 5 by 5 feet square. This pulverising should be repeated at least once in six weeks, and not oftener than once in three weeks. Bamboo stumps or other troublesome jungle which is hard to kill should be smothered with cut jungle and clods of earth. The heat generated by fermentation kills the young shoots effectually and the stump dies, and can be easily hoed away the next year, when it will have become rotten.

Roads.—The main section roads north and south and east and west are made first of all, and the section roads are made according to the nature of the land at the time of planting, but the cart roads on broken land require to be made with much judgment as they must run to every part of the garden, and all sudden ascent must be avoided. If they are made too early and before the lay of the garden has been carefully studied, it nearly always happens that they run in the wrong direction or straight where they should wind, or *vice versâ.* They should be not less than 12 feet wide, and it must not be forgotten that the chief object of a cart road is to enable the traffic on it to be conducted with the least possible expenditure of force. A road should therefore be taken a long distance in order to lessen a gradient. A gradient of about 1 in 20 is not too steep for a cart road. "Road tracers" should always be used when a road is either taken up or round a hill. They are very simple and easily worked. The plants which are lifted from the roads are used for filling up vacancies. The lines, if possible, should be near a navigable stream, and a cart road can be made to run from the ghat on the stream through the lines to the garden. Artificial manure can then be carted from a godown at the *ghat* to the garden paths round the edges of *teelahs*, and round the outer edge of the whole garden are very useful both for supervision, and to prevent the encroachment of the jungle and loss of bushes from jungle fires. A path round dark corners and inaccessible places, insures good work in those places even if the path is seldom used. Before leaving this subject, reference must be made to the numerous Government roads, the best of which have been made by planters. Only those who travel between the tea gardens and police stations in the rain, can form any idea of the disgraceful condition into which the roads are allowed to fall; and although this in new districts and in flood seasons is to a great extent unavoidable, there is often not a passable road of any length in a whole district, even in seasonable rainy weather. In Sylhet particularly, roads are bad, and in many places there are none, notably between S. Sylhet and Sylhet Station, the road stops halfway at Fenchooguugee on the Kooswari River. The roads are sometimes very good in the most difficult jungly places where the planters have made them, but through the villages and rice-fields where a perfectly straight road could be easily made: the course of the roads represents a succession of figures like the three sides of a square, and where there are many of these eccentricities, the distance is considerably more than doubled. The reason given for this by those who made the roads is that the Deputy Commissioner decided that the rights of the poor villagers should not be interfered with, and the poor villagers directed the road constructor to these old pieces of rough land which were useless to them, and suggested that these places were just in the line of country, and would make a more desirable course for the Government than a road. After the Chief Commissioner had ridden through one of the main roads, it was straightened in parts and much improved, but other and quite as important roads, remain in a condition which is a disgrace to any community attempting civilization. There are, it is said, large sums set aside by the authorities for roads, but even if money were short, there can be no valid reason why they should not be made straight. These eccentric puzzle-shaped roads appear to be peculiar to Sylhet. In Assam, the natural difficulties are very great, but struggles are being made to overcome them, and in some parts of Upper Assam the roads are excellent. The main roads into Cachar are in some cases good, but there is much room for improvement generally. Cachar however—thanks to the tea planter—is in this respect far ahead of Sylhet—the older district. In Ceylon owing to the energy of the old coffee planters, and to the natural advantages of their being generally a quantity of stones available, the roads are superior to any in the Indian tea districts unless perhaps those of Darjeeling.—*Planters' Gazette*, English paper.

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TEA DOCK CHARGES.

It is announced by the Dock Companies of London that they will, after the 1st July, allow no discount off their import charges on Tea, but fix a set rate from which there will be no abatement. The Wharfingers have also agreed between themselves and with the Dock Companies that they will only allow a uniform discount of 10 per cent off the latter's charges. This return to the system, of having a fixed scale of charges which is known to everyone, is highly satisfactory. It is to be hoped that the Dock Companies will have the courage to return to their former system of fixed and open rates on all other goods as well as Tea, for in some commodities the so-called "discounts" are simply ruining the trade of London, and driving it to other ports. There is one important grievance which has long called for removal, which the change announced by the Dock Companies does not touch. Some years back, before the discount system was commenced, the Dock labourer struck for higher wages, which were granted by their employers, and made up for by extra charges imposed upon the home trade. The rise in the rates was supposed to be 25 per cent, but in many cases they were actually double. No part of the burden was placed upon the importers, who, on the contrary (when wages, as they soon did, fell to their previous point), were gradually relieved of one-third to one-half of the charges they previously paid.

The abolition of the discount system affords an opportunity for the home trade to insist upon a return to the previous rates, and to call for a general revision of the system of charges. The Wholesale Tea Dealers' Association has had this difficult matter in hand for a long time, but there has been no opportunity as yet for bringing things to an issue. It is in some respects a misfortune that the directors of the two chief Dock Companies, though they number between them no less than eighty-two, should represent the importing interest almost exclusively, under the idea that that alone can "influence business," as it is called—that is, cause goods to be stored at the Docks. This notion may have much to recommend it from the point of view of the Dock shareholders, but in the long run their interest is coincident with that of the home distributors and the public. In trades in which other ports compete, the business, if the charges are too high, would leave London, and in those where there is practically no competition, as is the case with Tea, the rates, through the absence of fresh views and discussion, become stereotyped, and the trade is burdened with unnecessary payments and with an antiquated system of warrants and weight-notes that add enormously to the cost of carrying it on. The result is that Tea is stored for the shortest possible period in the docks and wharves, and that all sorts of expedients are resorted to, to minimise the charges. Amongst others, it has been found advantageous to remove large quantities of Teas under bond at prompt, to the warehouse of a Wharfinger, whose home charges are more reasonable. It might be thought that the preponderating influence of the importing interest in arranging dock and wharf charges would ensure low rates in those items which the merchants have to bear. This, however, is not the case in Tea, where the Importers have to pay treble the charges levied on similar produce, such as Coffee and Cocoa. Yet the docks and wharves state that the charges on Tea last year landed them in loss. The explanation of this is to be found in the totally unnecessary amount of detail work in the Tea trade. It has been shown (P.M.R., vol. xiv, page 76) that about thirty separate operations are necessary before a chest of Tea can be delivered, owing to the complications of the weight-note and warrant system.

The Tea trade have been protesting for years past against the oppressive charges with which they are saddled; but their protests are of no avail, though with sufficient union nothing could be easier than to bring about a revision of charges which should be fair to all parties. The Dock Companies and Wharfingers could be first of all approached with a request for a return to the old home trade rates on Tea, now that so much will be gained in the import charges by the abolition of the discount system. If this request were rejected, and sufficient unanimity was found to exist, further steps could be taken. A large body with the most diverse views is never likely to act together, except on points that are clearly reasonable; but in his case the interests of sellers and buyers are really identical. Why should Tea pay three times the import charges on Coffee, unless it be because the former trade is hampered with all sorts of obsolete conditions of working?

The Dock import charges on Tea from the 1st July will be as follows, and the Wharfingers have agreed not to allow more than 10 per cent discount off them:—

Per Package weighing Gross.

	160 lbs. to 199 lbs.		130 lbs. to 159 lbs.		80 lbs. to 129 lbs.		60 lbs. to 79 lbs.		45 lbs. to 59 lbs.		35 lbs. to 44 lbs.		17 lbs. to 34 lbs.		Not exceeding 16 lbs.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Landing & Housing Rate	2	8	2	0	1	6	1	1	1	[illegible]	1	0	0	7	0	3
Management Rate	3	2	2	6	2	0	1	6	1	4	1	2	0	8	0	4
Bulking and Taring	2	3	1	10	1	6	1	3	1	0	0	10	0	8	0	6
Bulking, Taring, or Weighing Not separately	1	6	1	3	1	0	0	10	0	8	0	7	0	6	0	5
Weighing Net & Bulking	3	0	2	6	2	0	1	8	1	[illegible]	1	2	1	0	0	10
Rent, per week	0	1	0	[illegible]	0	0¾	0	0½	0	0½	0	0½	0	[illegible]	0	0¼

Dock House,
109, Leadenhall-street,
July 1st, 1885.

ENSILAGE EXPERIMENT IN DENBIGHSHIRE.

To Mr. Andrew Murray, Furnace Farm, R.S.O., Denbighshire, we are indebted for the following description of a silo invented and patented by Mr. M'Intyre, agent on Lady Willoughby's Gwydyr estate, which is believed to be unparalleled in construction:—

So far as the walls and floor are concerned no special notice is necessary, as they are simply the walls of an old barn or stable lined inside with a thick coating of cement. The unique and ingenious part of the arrangement is that the weighting apparatus serves the double purpose of roof as well as pressing the silage. This is accomplished by means of open water tanks, made of wood and lined with zinc. The tanks are suspended by chains, which pass over pullies fixed in iron standards resting on the wall, and which rise sufficiently high above the level of the walls to allow the tanks to be drawn up so high that they in no way interfere with the filling of the silo. To the ends of the chains passing over the pullies, and on the outside of the wall, are attached small water-tight boxes. These are so adjusted that two boxes—one each end of the tank—when full of water balance the large tank when empty. Provision is made for the tanks to be kept in their places when moving up and down, so that they don't come in contact with each other nor with the walls. There is also a simple and efficacious arrangement for preventing rain water from getting down the sides of the tanks, and is, I believe, thoroughly effective.

The present method of drawing off the water when the tanks have to be lifted is by a neatly constructed syphon, but I understand Mr. M'Intyre has under contemplation an arrangement on the double-pulley system, which will render it quite unnecessary to run off any water. The silo is 14 feet square, and two tanks cover it. The tanks are by no means cumbersomely large. It is found that 2 cubic feet of water, in addition to the weight of the tank, is sufficient for each square foot of silage to be pressed. The whole thing is constructed with a considerable amount of skill, forethought, and ingenuity, and is unquestionably a credit to the inventor.

I am sorry I cannot give details as to cost of construction, but it seems to me that where water can be taken to the silo by gravitation, the outlay would be small in comparison to that for an ordinary roof and any of the more common weighting appliances. The silo was empty when I saw it; but I had the pleasure of examining a sample of silage from it some months ago, which was really of excellent quality. I am assured there was not a particle of waste at the sides or top. This is more than we have been able to attain in either of our silos.—*North British Agriculturist.*

A SKILFUL SURGICAL OPERATION.

The American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billroth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered— the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms:—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "all gone" sensation; a sticky slime collects about the teeth, especially in the morning accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow; the hands and feet become cold and sticky—a cold perspiration. The sufferers feel tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often-times there is a palpitation of the heart, and the patient fears he may have heart-disease. Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomesg closed, or nearly so. Although this disease is indeed alarmin, sufferers with the above-named symptoms should not feel nervous, for nine hundred and ninety-nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner. The safest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White (Limited), 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

St. Mary-street, Peterborough.
November 29th, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia ; but after a few doses of the Syrup, I found relief and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr. A. J. White. William Brent.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer described it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Sd.) Vincent A. Wills,
To Mr. A. J. White. Chemist-Dentist, Merthyr Tydvil.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

Preston, Sept. 21st, 1883.

My dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully, in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.

I am, dear Sir, yours faithfully,
To A. J. White, Esq. (Signed) W. Bowker.

Spanish Town, Jamaica, West Indies, October 24, 1882.

Dear Sir,—I write to inform you that I have derived great benefit from "Seigel's Syrup." For some years I have suffered from liver complaint, with its many and varied concomitant evils, so that my life was a perpetual misery. Twelve months ago I was induced to try Seigel's Syrup, and although rather sceptical, having tried so many reputed infallible remedies, I determined to give it at least a fair trial. In two or three days I felt considerably better, and now at the end of twelve months (having continued taking it), I am glad to say that I am a different being altogether. It is said of certain pens that they "come as a boon and a blessing to men," and I have no reason to doubt the truthfulness of the statement. I can truly say, however, that Seigel's Syrup has come as a "boon and a blessing" to me. I have recommended it to several fellow-sufferers from this distressing complaint, and their testimony is quite in accordance with my own. Gratitude for the benefit I have derived from the excellent preparation, prompts me to furnish you with this unsolicited testimonial.

I am, dear Sir,
Yours ever gratefully,
(Signed) Carey B. Berry,
A. J. White, Esq. Baptist Missionary,

Hensingham, Whitehaven, October 16, 1882.

Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(C.) (Signed) John H. Lightfoot.

GOLD MEDAL, PARIS, 1878.

JOSEPH GILLOTT'S

STEEL PENS.

BY ALL DEALERS THROUGHOUT THE WORLD.

Holloway's Pills.—Sleeplessness, flatulency, acidity, nausea, and all dyspeptic indications may be speedily relieved by these famous Pills, of which large quantities are shipped to all parts of the world. The constantly increasing demand for Holloway's medicine proves its power over disease, and its estimation by the public. In weakness of the stomach, in diseases of the liver, and in disorders of the system caused by cold or a sluggish circulation, no medicine is so efficacious, no remedy so rapid, as these Pills, which are altogether incapable of doing mischief. By quickening digestion, they give refreshing sleep, sharpen the appetite, impart tone to the digestive organs, purify and enrich the blood, regulate the secretions, and strengthen the whole physical frame.

FOR PRICKLY HEAT, CONSTIPATION, HEADACHE, BILIOUSNESS, CHOLERA, FEVERS, &c.

The testimony of Medical gentlemen has been unqualified in praise of

LAMPLOUGH'S PYRETIC SALINE,

As possessing elements most essential for the restoration and maintenance of health with perfect vigour of body and mind.

It is Effervescing & Tasteless; forming a most Invigorating, Vitalising & Refreshing Beverage.

Gives instant relief in HEADACHE, SEA or BILIOUS SICKNESS, CONSTIPATION, INDIGESTION, LASSITUDE, HEARTBURN, and FEVERISH COLDS; prevents and quickly cures the worst forms of TYPHUS, SCARLET, JUNGLE, and other FEVERS, SMALLPOX, MEASLES, and ERUPTIVE or SKIN COMPLAINTS, and various other altered conditions of the Blood. A valuable PREVENTIVE of DYSENTERY.

Dr. PROUT.—"Unfolding germs of immense benefit to mankind."

Dr. MORGAN.—"It furnishes the blood with its lost saline constituents."

Dr. SPARKS (Government Medical Inspector of Emigrants from the Port of London) writes:—"I have great pleasure in bearing my cordial testimony to its efficacy."

GOVERNMENT OFFICIALS AND PLANTERS caring for the welfare of their employes should note its value as a specific in Fever Cases.

Dr. J. W. DOWSING.—"I used it in the treatment of forty-two cases of Yellow Fever and am happy to state I never lost a single case."

Dr. W. STEVENS.—"Since its introduction the Fatal West India Fevers are deprived of their terrors."

HER MAJESTY'S REPRESENTATIVE the GOVERNOR of SIERRA LEONE, in a letter of request for an additional supply of the Pyretic Saline, states:—"It is of *great value*, and I shall rejoice to hear it is in the hands of all Europeans visiting the Tropics."

RAWUL PINDEE, PUNJAUB, INDIA.—"We firmly believe that the use of your Pyretic Saline will do more to prevent fever than all the Quinine ever imported can cure."

Dr. TURLEY.—"I found it act as a specific, in my experience and family, in the worst forms of Scarlet Fever, no other medicine being required."

Dr. S. GIBBON (formerly Physician to the London Hospital).—"Its usefulness in the treatment of disease has long been confirmed by medical experience."

To be obtained of any Chemist or Drug Store, in Patent Glass-stoppered Bottles, at various prices.

Please note in connection with the recently observed effects of the use of Citrate and other preparations of Magnesia that LAMPLOUGH'S PYRETIC SALINE is warranted not to contain Magnesia or any substance which would cause calculous or other earthy deposits.

H. LAMPLOUGH, 113, HOLBORN HILL, LONDON, E.C.

HEALTH FOR ALL!!!

HOLLOWAY'S PILLS & OINTMENT

THE PILLS

Purify the Blood, correct all Disorders of the

LIVER, STOMACH, KIDNEYS, AND BOWELS.

They invigorate and restore to health Debilitated Constitutions, and are invaluable in all Complaints incidental to Females of all ages.
For Children and the aged they are priceless.

THE OINTMENT

Is an infallible remedy for Bad Legs, Bad Breasts, Old Wounds, Sores and Ulcers.
It is famous for Gout and Rheumatism. For disorders of the Chest it has no equal.

FOR SORE-THROATS, BRONCHITIS, COUGHS, COLDS,

Glandular Swellings, and all Skin Diseases, it has no rival; and for contracted and stiff joints, it acts like a charm.

Manufactured only at Thomas Holloway's Establishment,
78, NEW OXFORD STREET (late 533, OXFORD STREET), LONDON,
And are sold at 1s. 1½d., 2s. 9d., 4s. 6d., 11s., 22s., and 33s. each Box or Pot, and may be had of all Medicine Vendors throughout the World.
☞ *Purchasers should look to the Label on the Pots and Boxes. If the address is not 533 Oxford Street London, they are spurious.*

Registered No. 182.]

THE

INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, AUGUST 29, 1885. [No. 35.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING AUGUST 19, 1885.]

General Remarks.—Rain has fallen during the week in all districts of the Madras presidency from which reports are received. In Bellary heavy rain is urgently required for the early dry crops. Prospects are still unsatisfactory in Madura, and more rain is wanted in Ganjam, Coimbatore and Tanjore. Elsewhere prospects are generally good, and improvement has taken place in Anantapore. In Mysore very slight rain has fallen, the crops are in a critical condition, and pasturage and water are failing. In Coorg prospects continue good.

Prospects have greatly improved in the Bombay presidency, in consequence of the recent rainfall, but more rain is urgently wanted in parts of Sholapore and Bijapore. In these districts and in Nassik, Poona, and Ahmednugger fodder is scarce. *Kharif* sowings are still in progress in places. Rain has fallen in the Berars and Hyderabad, and the condition of the crop is favourable. In the Central India and Rajputana States rain has been general, and the crops are generally in a satisfactory condition.

Good rain is reported to have fallen throughout the Punjab, with the exception of the Lahore district. *Kharif* prospects are generally favourable. Rain has fallen in most districts in the North-Western Provinces and Oudh, and a break is now wanted. Crop prospects are good, though some damage has been caused to cotton, indigo, and the crops on low lands. Rain has been general in the Central Provinces, and prospects are good.

In Bengal rain has been fairly general, but more is wanted in some districts. Early crops are generally doing well, but in some places in Behar and the Burdwan divisions and in Moorshedabad injury has been caused by floods. The *aus* rice harvest is progressing, with prospects of a fair average outturn; and *aman* rice is being transplanted. Seasonable weather prevails in Assam, but in Sylhet more rain is much needed for the paddy crop on high lands. Transplanting continues.

In British Burmah the rains have been seasonable in all districts, except Prome, where more rain is required. Ploughing, sowing, and transplanting are in progress.

The public health is generally fair.

Prices are fluctuating in the Punjab, and have risen slightly in Mysore. Elsewhere they are fairly steady.

Madras.—General prospects fair, improved in Anantapore; in Bellary early dry crops will be lost if heavy rain does not fall soon; in Madura reported to be discouraging.

Bombay.—Good rain throughout the presidency. General prospects greatly improved. More rain urgently wanted in parts of Sholapore and Bijapore. Crops injured by insects in parts of Kurrachee, Hyderabad, and Upper Sind Frontier; scarcity of fodder in parts of Nassik, Poona, Ahmednugger, Sholapore, and Bijapore, and of water in parts of Sholapore. Cholera in parts of eighteen, fever in parts of nine, cattle-disease in parts of seven, and small-pox in parts of three districts.

Bengal.—Rain has been fairly general in all districts, more rain is wanted in some districts. Early crops are generally doing well, but in some places in Behar and the Burdwan divisions and in Moorshedabad, they have suffered from floods; *aus* rice harvest is progressing, with prospect of a fair average outturn; transplanting of *aman* rice still proceeding. Price of rice continues high. General health not so satisfactory as before, fever and cholera being prevalent in many places.

N. W. Provinces and Oudh.—Rain has been pretty general during the week, and a break is now needed. Prospects are good, though some damage has been caused to cotton, indigo, and crops on low lands. Markets well supplied, and prices generally steady. Public health fair; cases of cholera reported from a few districts.

Punjab.—Good rain throughout the province, with the exception of the Lahore district. Health good. *Kharif* prospects generally favourable. Prices falling in the Delhi and Peshawur districts, rising in the Ferozepore, Sialkot, Mooltan and Rawul Pindee districts, and generally stationary elsewhere.

Central Provinces.—Weather alternately clear and wet. Weeding continues; prospects of crops favourable. Cholera in Raipore; elsewhere health generally good. Prices steady.

British Burmah.—Cholera prevalent in one district, slight in four districts; small-pox slight in one district, elsewhere public health good; cattle-disease somewhat prevalent in one district, slight in three districts, elsewhere health of cattle good. Ploughing, sowing, and transplanting progressing. Rains seasonable in all districts, except Prome, where more rain is required.

Assam.—Weather warm. Reaping of *dumahi* and *murali* crops nearly finished; transplanting of *sali* crops in progress. Common rice 10 seers per rupee. Prospects of tea good. Health good.

Mysore and Coorg.—Rain needed everywhere and specially in parts of south-eastern Kolar, Northern Tumkur and Chitaldroog, and north-eastern of Mysore, where unless timely fall occurs, the young dry crops which are the staple of the country will die; they are reported to be withering in some quarters and to be in a critical condition in others; cattle-disease reported in parts of Bangalore. Pasturage failing and water-supply scanty. Crops in good condition. Price of food-grains has slightly risen. Prospects of season and public health good.

Berar and Hyderabad.—Rain very beneficial to standing crops. *Abi* sowings progressing. Cholera still prevails in the city and suburbs and at Seram, but general health in the districts good.

Central India States.—A break in rains desirable. Health good. Prices stationary. Weather very hot, with thunderstorms and occasional showers. 15 deaths from cholera in Sewri, 2 or 3 deaths daily in Bhopal. Prospects of crops unfavourable.

Rajpootana.—Tanks and wells full. Crop prospects good. Health good. Prices steady.

Nepal.—Prospects good. Cholera continues.

Letters to the Editor.

PROGRESSIVE RATES.

TO THE EDITOR.

SIR,—I do not think short leases are good for tenants, as it keeps up their anxiety as to the terms on which the next settlement will be made. At the same time a long lease involves in newly settled countries a wanton sacrifice of revenue. I shall give you an instance: Baminghattee has never been surveyed before. The ryots are paying now at the rate of about 5 annas 6 pies per man of 22,500 sq. ft. per man. A short lease will displease the people, as the visit of the Ameens is most dreaded. You cannot treble or make fourfold the present rates. The case of the Central Provinces is probably on a larger scale than that of Baminghattee. What do you think of progressive rates? I shall suppose that the rate in the Central Provinces is 4 annas per bigha now, and the fair rate would be 12 annas. In that case, why not grant a lease of 30 years, but make the rates progressive, say 8 annas for the first ten years, 10 annas for the next ten years, and 12 annas for the last ten years. Progressive rates have been adopted in the case of the waste lands that are granted in Assam to tea planters. I see no reason why they should not be granted to ordinary ryots. Hoping to hear what you have to say against progressive rates,

S. DUTTA.

Settlement Officer in Mourbhanj.

P.S.—Do you know of any province where progressive rates have been granted to ordinary ryots?—S. D.

NOTE.—We believe that progressive rates are unknown in India, so as we are aware; but we should be glad to have any information on subject. We are in favour of progressive rates, although we do not approve of very long leases.—ED., *I. A.*

Editorial Notes.

A REPORT from north Borneo says that gold in paying quantities has been found in the bed of the Segama river. Samples had been sent to Hongkong, which, on analysis, gave excellent results, and a company is to be formed to work the mines.

***

THE quantity of tea exported from China and Japan to Great Britain, from the commencement of the season to the 30th of July last, was 69,119,488lbs., as compared with 70,508,682lbs. exported in the corresponding period of last year. The exports to the United States and Canada during the same period were 20,987,321lbs. as against 21,824,526lbs.

***

A VERY thoughtful article recently appeared in the columns of the *Indian Mirror*, "On the necessity of Improved Tillage in Bengal," which we reproduce elsewhere. The subject of improved agriculture is come to be recognised as one of paramount importance, and we are glad to see such a journal as the *Indian Mirror* taking up the subject with such earnestness.

***

A CORRESPONDENT from Bhagulpore writes to the *Statesman* that a project to start a sugar manufactory, and in connection with it, a rum distillery, is on the *tapis* there among the mercantile community. A native gentleman, who has had considerable experience in the distillery business, is prepared to take the management of such a concern, and to invest a considerable amount of capital in the venture.

***

WE have been favoured with the first three numbers of the *Journal of the Agricultural Students' Association*, for the months of April, May, and June 1885, which is published at Madras. We have no hesitation in saying that it is likely to do much good to the cause of agriculture in India. The *Journal* contains some good articles and well-selected papers from high-class publications devoted to agricultural subjects. We congratulate the promoters, and hope they will achieve the success they deserve.

***

THE introduction and cultivation of the cocoa tree in Singapore have given satisfactory results; for from the last report of the Botanical Gardens there, it appears that Mr. Cantley, the Superintendent, has been trying to acclimatise this tree for some time, and has succeeded in his efforts. We are told that it has not only flowered, but has fruited freely during the year. This ought to be good news to the planters on the island, as opening up a field for a new industry. They will no doubt think it worth their while to undertake further experiments with this plant.

***

LAST week we drew attention to the mining industries in Burmah. We now learn that it is proposed to start a limited libiality company in London, to be called the British Burmah Lead Company, for the purpose of working the lead mines in Burmah. The province is rich in minerals, and needs only capital and energy to bring its resources within reach of the trade. We hope the example of this new company will soon be followed by others to work the iron, tin, and coal mines. There is also earth-oil, with antimony and galena: these are all worth working.

***

A CONTEMPORARY has received a letter from Kumaon, dated 10th instant, which says that the rainfall since the beginning of the month had been unusually heavy for August, bringing the total fall this season up to 33 inches. The rice crop was good, but millet and *bhut*, a species of pulse, were failures. Tea-making was actively progressing, but it was not expected that more than 100,000 lbs. of green tea, if so much, would be made for the Central Asian market, the uncertainty of our relations with Russia having alarmed the native merchants. A good deal of tea made in the district is now sent to the Kothgodan station of the Rohilkund and Kumaon Railway, instead of by the old circuitous route *vià* Almorah or Ranikhet to Moradabad, a great saving in transit charges being thus effected.

***

COLONEL ROGERS, the Superintendent, Madras Survey, has very properly pointed out to the Government the incongruity of demarcating and surveying unassessed waste in a district in which field demarcation does not exist, as is the case in the Godavery district, and that the operation cannot, any way, be undertaken before the next official year 1886-87, by the party No. 1, which is engaged upon important topographical and revenue survey now. Colonel Rogers observes, with perfect truth, that, the experience of the department has always shown that it is more economical, and in every way far more satisfactory, to employ a strong party under the best supervision, and to finish a work quickly, than to entrust it to a small party under subordinate supervision, and allow it to extend over a long period." And the wonder is that this should not have occurred to the Government of Madras!

***

PUMPKINS are spoken of as something new in the way of food for horses. One writer, addressing himself to an Australian paper, says:—'I consider pumpkins a first-rate winter feed, keeping the bowels open and giving a gloss to the coat. It is very hard to get horses to take to them. I have tried almost every way I could think of—chopped the pumpkins up and given it with chaff and corn, put salt into the nose-bags, boiled it—to no purpose. We had a good supply last winter, and tried to feed our horses on it, but they would not touch it. The only way is to get a horse which has been fed on pumpkins, and let him go with your horses. When once a horse takes to them, he becomes very fond of this feed. For feeding prize stock, they are of great value. One boiled pumpkin is worth two uncooked ones." This is certainly not encouraging, but if the vegetable really possesses the good qualities ascribed to it, an attempt should be made to use it largely.

***

THE ryots of the Anantapore district do not seem to have appreciated the "benevolent objects" of the Government in sending a boring party among them to strike water when there was such a scarcity of this fluid in those parts, for the officer in charge of the party of Sappers and Miners sent to bore wells, in submitting his report, says:—"Since these boring operations have been carried out, in no single instance, it is believed, have any one of the proprietors attempted to open out a well of any description, nor have they shown any personal interest in the matter, but rather have been unwilling to point where they would wish the borings to be made in their respective properties, when called upon to do so. This apathy on their part is much to be deplored, for the expenditure incurred is very considerable, even after deducting the value of the tools and plant, but it was conjectured, at the outset, that the ryots anticipated advances being made to them which they could turn to account or not as they thought fit." It seems that water was struck at moderate depths; but, on the whole, the success of the experiment was of a negative kind, and the Madras Government have pronounced the deputation of trained boring parties as premature until such time as the means of protection from drought have been fairly started by the construction of a few wells.

***

THE following is a summary of Messrs. William James and Henry Thompson's fortnightly Circular of Indian Tea, dated London, 30th July 1885:—Upwards of 22,000 packages have been catalogued for sale during the fortnight, including 11,300 new season's, 6,500 from Ceylon, and 4,000 of old season's tea. There has not yet been sufficient recovery in demand from the country to give life to the market, and the sales have passed with a dull tone. During last week quotations were very weak and irregular, showing in most cases a decline of 1*d.* to 2*d.* upon Pekoes and Broken Pekoes, and ½*d.* upon Souchongs and Brokens. This week the market has been steadier, with rather firmer rates for low-priced teas. The large supplies from Ceylon have sold freely, but the previous range of price has not been maintained, except for the finest qualities. From Calcutta, we learn that about 20,000 packages were sold at the sales of the 16th and 23rd instant at an average of 10¼ annas, a reduction of 1¼ to 1½ annas upon the previous quotations. To-day about 13,000 packages are offered, and lower prices are quoted in the telegrams. The exports to the 4th instant were 5,000,000lbs., as compared with 3,600,000lbs. last season. The next auctions here take place on the 5th August.

⁂

The returns of railway-borne traffic in the Central Provinces, during the quarter ending 31st March 1885, show that the traffic of the quarter under notice, while almost equalling that of both the preceding quarters taken together, falls considerably short of that of the first quarter of the year. But this is to be expected, as the months immediately following *rabi* harvest, which fall in the first quarter of the year, are, as a rule, more brisk in traffic. The gross traffic of the quarter, as compared with the three preceding quarters, is as follows :—

	Imports. Maunds.	*Exports.* Maunds.
Ending 30th June 1884	9,40,000	65,79,000
,, 30th Sept. ,, ...	3,02,000	20,36,000
,, 31st Dec. ,, ...	5,67,000	31,58,000
,, 31st March 1885	7,23,000	48,75,000

Of the imports, the principal items were—

Salt	2,74,948 mds.,	or 38 per cent.
Sugar	1,74,921 ,,	,, 24 ,, ,,
Metals	61,547 ,,	,, 8 ,, ,,

Cotton goods—34,543 maunds, or 5 per cent.

Practically, the whole of the salt, and 80 per cent of the fine sugar imported, came from Bombay. But 80 per cent of the total sugar imports consisted of the coarse compost known as *goor*, and for this the North-Western Provinces and Bengal were drawn upon. The metals and cotton goods were principally derived from Bombay, being for the most part European goods imported *via* the Bombay Port.

⁂

Of the total exports, the principal items were—

	Maunds.	
Coal	5,38,590,	or 11 per cent.
Wheat...	24,54,160,	,, 52 ,, ,,
Rice	6,09,000,	,, 125 ,, ,,
Grain	2,08,027,	,, 4 ,, ,,
Linseed	6,41,626,	,, 13 ,, ,,
Tilseed	1,48,041,	,, 3 ,, ,,
Hides	27,033,	,, 0·5 ,, ,,

From the foregoing figures it will be seen that *wheat* constituted more than half of the export trade. It was, practically speaking, all consigned to Bombay and the Norbudda block, including the districts of Nursingpore and Hoshungabad. The quantities consigned from the Jubbulpore, Nagpore, and Chuttisgurh blocks amounted respectively to 2¼, 2¾, and 2 lakhs of maunds, while the amount exported from the Nerbudda block reached the high figure of 17 lakhs of maunds. The *rice* was consigned partly to Bombay, and partly to places in the Berars and Bombay Presidency, and was produced chiefly in the Chuttisgurh division. The *linseed* was all taken by Bombay, Chuttisgurh supplying nearly half the quantity exported, and the Nagpore block, the greater part of the remainder. More than half the quantity of *hides* exported was also contributed by Chuttisgurh, which was due to the great mortality amongst the cattle of that tract during the preceding rains.

⁂

Mr. Bosworth Smith, the Government Mineralogist, Madras, has been prosecuting his explorations with much assiduity. His experiments with galena and pyrites are likely to throw some light upon the question as to how the gold occurs in these ores. He has been examining the workings of the Ilitorai Gold Mines, and finds that the minerals that occur there are copper pyrites and galena, deposited mostly in the central portion of the reef. In a piece of quartz that he picked up, he found a little calcite, but there was no gold visible, and very little iron pyrites. He gives the method adopted at the mine of extracting the precious metal from quartz, and estimates the outturn at 8 grains of gold per ton of quartz. cost of extraction was found to be Rs. 40-12 per ton quartz, and the gold extracted fetched Rs. 300 per ounce. The manager of the mine estimates that if the quartz would yield 3 dwts. per ton, the ore would just pay expenses. He attributes the cause of failure to the "sickening" of the mercury preventing the gold from forming an amalgam, but adds that, even if this were prevented, it by no means follows that amalgamation is the best process for the ore; the gold being, he believes, if free, in too fine a state of division; and if occurring in the galena and copper pyrites, in a totally unfit state for this process. There cannot be any doubt that Mr. Bosworth Smith is the right man in the right place. His diaries display a mastery of the subject in hand; and if the Southern Presidency possesses any minerals of value, they will doubtless be brought to light in due course.

We have before us the report of the Director of Agriculture and Commerce, N.-W. Provinces and Oudh, on the ensilage experiments carried out last year at the Cawnpore Agricultural Station. We give the report, which is a brief one, in the Director's own words :—"Between the months of September and December of last year, 13 pits were filled with fodder for ensilage; 3 of these were old masonry pits built some years ago in connection with a scheme for subsoil drainage, and the remaining 10 were merely holes of various sizes and shapes, especially dug for the purpose in a plot of elevated ground. Over 7 of the 10 pits thus dug, cheap straw thatchings were placed for protection. The other 3 pits were protected by tile roofs and covered over by conical mounds of earth to a height of from 3 to 4 feet. *Juar*, sorghum, dub grass, and guinea grass were the fodders ensilaged. A small portion of the *juar* had been cut in flower, but the greater part of it after the grain had got well on towards ripening. The other crops were cut when in flower. The silos were filled gradually in layers, two days being generally allowed to intervene between the successive fillings. On the opening of the pits, it was invariably found that, with the exception of the mouldy crust of about six inches thickness on the top and round the sides, the fodder had been well preserved, and was freely eaten by cattle."

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The total cost of the 13 silos amounted to Rs. 304, the lowest cost of one being Rs. 2-1, and the highest Rs. 120-12. The total amount of fodder silaged weighed 4,967 maunds. The smallest silo contained 61 maunds, and the largest 1,833 maunds. The largest silo, which was eliptical, measured 30′ × 18′ × 13′ and the smallest, which was circular, 6 × 10′. They were all filled between September and December 1884, and opened between February and June 1885, or on an average of five months after closing. We should have liked to have known whether the silage produced was sweet or sour in quality, whether any record was kept of the temperature of each silo, and whether there were any signs of the bacteria of fermentation in the silage when opened. Also whether, after having been opened for several days, there was any change in the quality of the silage, and whether cattle and horses partook of it as readily as when the silos were first opened. Without such particulars, it seems to us a waste of time, labour, and money to construct silos and store forage. The system of ensilage is in its experimental stage at present, and it was, we presume, with a view to ascertain the advantages, or otherwise of the system that the Government of India sanctioned experiments to be conducted. We hope that Government officials making silos will take note of these remarks.

THERE has been a good deal of discussion lately about the retention or otherwise of Rule 7 of the Madras Forest Act as it at present stands. Some doubts having arisen as to the precise application of this rule, the two Conservators of Forest were called upon to give their opinion, as it was thought that the rule bore with undue severity upon the poorer classes. Both the Conservators are, however, opposed to any radical alteration in the rules until experience has shewn such to be necessary. At the same time they admit that in certain cases the rules as they stand at present bear hardly on the poorer classes, but they are at one in their desire to retain Rule 7 substantially as at present, and to carry it into effect without delay. The Board of Revenue, on the other hand, are prepared to concede the privileges in question not only to ryots, but to all villagers, "without any check or hindrance by village heads." With such variable opinion to go upon, the Madras Government have very naturally been placed *in* a somewhat difficult position; but on further consideration, they are of opinion that it will be better for the present at least to retain Rule 7 substantially as it stands, but to alter it in some respects to meet the views of the Board of Revenue; so that the much-vexed rule, as amended, will run as follows:—

"Where the practice of grazing cattle, sheep or goats, or of cutting trees (other than reserved trees) or other forest produce for fuel, or for building, agricultural, or domestic purposes, or of cutting grass for thatching or fodder, or thorns for fences or leaves of trees (other than reserved trees) for manure, free of charge, has long and steadily obtained, the Collector shall set apart once for all such areas as he may consider reasonable for this purpose, and shall, &c., &c." (as at present.)

Although this amendment does not meet all the requirements of the case, it goes far towards reducing the severity of the rule as bearing on the poorer classes.

WE learn that manufacture is now finished at most of the indigo concerns in Lower Bengal, and though details have not yet been furnished, the estimated outturn is about 20,000 maunds. Very heavy rain fell over nearly the whole of Behar, between the 6th and 12th instant, which somewhat reduced the produce, and the result of the first cuttings (which are now nearly all worked off), is estimated at 37,000 maunds, or about the same as last year. The heavy rain seriously damaged the *Khoontees* in some of the lowlying lands, and unless there is very favourable weather during the rest of the season, they are hardly likely to realise a fair return. *Khoontee Mahai* will commence early in September. The reports from Benares and the North-Western Provinces continue unfavourable, the plant being small and backward, and the yield very poor. The area under cultivation is smaller than that of last year, the weather throughout has been most unfavourable, and there is now no doubt that the outturn will be less than that of last season.

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A CORRESPONDENT of the *Statesman*, writing from Rajmehal, under date the 18th instant, says:—"Mr. S. Sakhawat Hossein came here on the 13th instant to make enquiries into the native mode of agriculture, and try some experiments, and to teach us how to improve our farm. He has also given us to understand the advisability of ensilaging the *makai* stalks, the grain of which we cannot reap owing to the inundation. He has constructed here a silo for ensilaging grasses, and if this succeeds, we shall one and all adopt this method of storing our green fodder for cattle." It is gratifying to learn that members of the Agricultural Department of Bengal are taking the right steps to spread a knowledge of high-class agriculture among the people of the outlying districts. It is only by going among them, and enquiring into their methods of farming, and by suggesting improved methods, that the cultivators can be taught to introduce innovations which they would otherwise regard as dangerous and expensive.

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WE have received a little pamphlet of 82 pages, entitled a "Catechism on Soils and their Improvement," by M. Bhavani Shunker Rao. The author has given us a very interesting little treatise on a very important subject, and has handled the matter in quite a practical manner. The little pamphlet before us contains much useful information, and is likely to produce good effects if placed in the hands of zemindars and cultivators, by giving them sound answers to practical questions. To attain the object in view, it should be translated into the vernacular, when it will be better understood by the masses for whose benefit the catechism is presumably written. The author intends to follow this up by two other similar pamphlets, one on the *Staple Products* of the Madras Presidency, and the other on *Live Stock and its Management.* He deserves encouragement in his undertaking; and we hope he will receive active support in his endeavours to "diffuse a sound and precise knowledge of the elementary principles that underlie the successful cultivation of soil." It is gratifying to see *native* efforts put forward in this direction.

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THE much-talked-of Veterinary College and Hospital at Bombay has been shelved for the present financial year, and the decision of the Governor of Bombay on the subject has been communicated to the Bombay Society for the Prevention of Cruelty to Animals in the following terms, in a letter, dated the 4th instant:—"I am directed to acknowledge the receipt of the petition from the Bombay Society for the Prevention of Cruelty to Animals, dated the 11th ultimo, soliciting a re-consideration of the decision of this Government that the establishment of a veterinary college and hospital at Bombay should be deferred in accordance with the instructions received from the Government of India, to exercise the strictest economy in all departments, and requesting that that much-desired institution may be started at once, after revising, if necessary, the scale of the proposed monthly expenditure. In reply, I am directed to inform you that his Excellency the Governor in Council, whilst taking the warmest interest in the progress of veterinary science, and being most desirous that the Veterinary College and Hospital in Bombay should be established at the earliest practicable date, much regrets that it is at present not possible to follow the course recommended by you for adoption. The Government of India have been informed that the college will not be opened during the current financial year, and that there will consequently be an estimated saving of Rs. 28,000 under this head. In view of the many pressing demands for funds for institutions, such as hospitals for women and children, even more urgently needed than a Veterinary College and Hospital, the Governor in Council feels that it would be impossible to select the latter for exceptional treatment, and whilst refraining from incurring expenditure on objects for the benefit of suffering human beings, to move the Government of India to authorise a special outlay on a veterinary college."

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DR. GEORGE WATT, who was applied to by the Government of India to suggest the best method of preparing coca leaves for the market, has referred the Government to Spon's Encyclopædia as containing the information on the subject. The portion of the work he refers to, runs as follows:—"When ripe, which is known by their cracking or breaking off when bent, the leaves are sun-dried; this operation requiring special care. The green leaves are spread in thin layers on coarse woollen cloths, stretched upon prepared earthen or cement floors, after the manner of the 'barbecues' used in coffee-drying, and exposed to the heat of the sun; when perfectly dry, they are pressed into serons or skin bags. Every precaution must be taken to prevent their imbibing any moisture during exposure, and to ensure their not sweating either then or subsequently. Well-cured leaves are uncurled, of a deep green color on the upper surface, and grey-green beneath, with a strong tea-like odour and pleasant pungent taste, and produce a sense of warmth when chewed; inferior ones are dark colored, with a less agreeable camphoraceous smell, and are almost devoid of the pungent flavour and physiological effect." In his opinion the best work dealing with the subject is Gosse's *Monographie de l'Erythroxylon Coca.* Mr. Duthie, Superintendent of the Saharunpore Botanical Gardens, furnishes the following information on the subject:—"Judging from our mode of proceeding in the case of the henbane plant, of which we prepare annually for the Indian Medical Department both leaves and extract, I should be inclined to recommend as follows :—The young leaves should be plucked as soon as they are fully developed, a sufficient number being left so as not to weaken the bushes too much. The leaves should be gathered and handled with great care, for one of the most important constituents of this plant is an aromatic volatile alkaloid. They should then be spread out on mats and exposed to the sun until they are quite dry. Should the weather be unfavorable for drying the leaves by the heat of the sun, some artificial arrangement must be adopted. The dried leaves should be despatched to the market in tin-lined boxes. I should mention that in Bentley and Trimen's 'Medicinal Plants,' Vol. I, there is an interesting article on the coca plant, together with a colored figure." We may observe here that Dr. Bidie, of Madras, has most courteously placed at our disposal a small quantity of the dried leaves of the coca. We do not know what process he adopted, but the leaves are beautifully dried, and contain all their essential qualities. They have a pungent, aromatic odour, but are tasteless. We are having an analysis of the leaves made, and hope shortly to publish the results.

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Dr. E. L. Cleaver has been attempting the manufacture of quinine in India ; and to enable him to carry out his experiment, he was supplied with 2,000lbs. of the red barks by the Government of Madras. Dr. Cleaver succeeded in making three species of alkaloids, *viz* ;—

1. Sulphate of Quinine.
2. Febrifuge.
3. Crystalline Febrifuge.

He says that the "sample of quinine is not quite as white or as sil[illegible]ystals as Howard's, but is quite equal to many commercial specimens ; and, considering the very limited resources I have at my disposal, and the small scale in which it is prepared, it is, I think, a proof that it could be made commercially. It is prepared from red bark, and it is as pure as could be obtained from that kind. The febrifuge, although similar in color to Government preparation, is different in composition. The whole of the alkaloid in it is easily crystallisable, while it is a most difficult matter to crystallise much from the Government febrifuge. The crystalline febrifuge is prepared by simply crystallising No. 2." The Director of Government Cinchona Plantations, Madras, does not quite agree in Dr. Cleaver's conclusions. In reporting upon these alkaloids, he says :—"No. 1, which was forwarded by Dr. Cleaver as being sulphate of quinine, contains no less than 37·90 parts of sulphate of cinchonidine out of 102·07 parts. This large amount of cinchonidine would, in the present dogmatic state of the market, greatly impair the commercial value of this preparation, though, as Mr. Hooper very accurately points out, its medicinal excellence would not be interfered with. Analyses of Dr. Cleaver's sample No. 2 are compared by Mr. Hooper with analyses which he has recently made of samples of febrifuge obtained from the Government laboratory in Sikkim ; and from this comparison it will be seen that while Dr. Cleaver's febrifuge contains no quinine, that from the Sikkim laboratory contained 6·97 per cent. On the other hand, Dr. Cleaver's febrifuge contains 35·62 per cent of cinchonidine, while that from the Sikkim laboratory contained only 15·78 per cent. Therapeutically considered, the two febrifuges are probably of equal value. Of Dr. Cleaver's third sample Mr. Hooper says that, 'although labelled crystalline febrifuge, it is really nothing more than an unbleached preparation of quinine and cinchonidine sulphate, almost identical in composition with sample No. 1.' Dr. Cleaver, in his letter to Messrs. Arbuthnot and Co., and also in a letter to myself, states that he has labored under considerable difficulties in manufacturing these febrifuges, owing to his not having received certain necessary chemicals and apparatus. It is therefore to be presumed that, under more favorable circumstances, his account of the composition of the samples which he has sent would have been more exact ; and I have no doubt that, if a factory were to be established under his direction, a febrifuge of a high character might be turned [illegible] able cost."

These results are satisfactory so far that they [illegible] possibility of manufacturing quinine in India at low[illegible] it can be obtained from England. It is merely t[illegible] proper appliances. The material is at hand fresh, an[illegible] no reason why the sulphate of quinine cannot be man[illegible] here.

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The following is a summary of the weather for July 18[illegible] —Heavy rain fell at Mangalore on the 1st. This proved [illegible] be the beginning of a burst of rather heavy rain on the west coast, lasting until the 9th, and spreading northward as far as Rutnagiri without, however, reaching Bombay. Between the 10th and 16th, though rain fell daily along the west coast, the amounts were not large, but on the 17th a fall of six inches occurred at Bombay, and larger amounts on the neighbouring hills. This was the first downpour of the season on the Konkan coast, and resulted in extensive floods in the neighbourhood of Bombay. Rather heavy rain again fell along the Malabar Coast on the 23rd ; but, on the whole, the amounts recorded in the west of the peninsula, subsequent to the middle of the month, were moderate, and except in Malabar, the total rainfall of the month was below the average. In Gujarat the rainfall was nearly up to the average of the month, but this result was due rather to the occurrence of heavy local and spasmodic falls at Rajkote, Ahmedabad, and Broach than to steady, continuous rain throughout the month. In Sindh and Cutch and northward over the Punjab there was very little rain, the relative deficiency during the present month being even greater than in those provinces during June. In the central parts of the country, *i. e.*, Rajpootana, Central India and the Central Provinces, though the average was not actually equalled, the deficiency was small, and in the Berars, the Deccan, and Hyderabad, the average was slightly exceeded.

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In the eastern and central parts of the peninsula the normal westerly winds appear to have been exceptionally dry : and Mysore, Bellary, and the Carnatic had even less than the small average rainfall. Further north, in the Northern Circars, Orissa, Chota Nagpore, and Lower Bengal, there has also been a slight deficiency ; but in Assam, Cachar, Northern Bengal, and over the whole of the North-Western Provinces and Oudh the rainfall has been excessive. During the month several small, and in general feeble, depressions have travelled slowly up the Gangetic plain,—some apparently having been formed over the Gangetic delta, others over Behar or that neighbourhood. Though very slight when measured by barometric differences, some of these disturbances have occasioned heavy falls of rain, of which the more important are as follow :—

	Inches.		Inches.
Darjeeling, 2nd	... 4·38	Dinagepore, 12th	... 4·41
Bahraich, 3rd	... 4·02	Sutna, 13th	... 5·01
Mozufferpore, 4th	... 5·20	Aligurh, 16th	... 5·50
Naini Tal, 3rd and 4th	... 14·80	Benares, 22nd	... 4·68
Saugor Island, 7th	... 4·27	Saugor Island, 29th	... 6·15
Bareilly, 11th	... 4·21	Mussoorie, 30th	... 5·48

On the whole, the rainfall of the month has been more favorable in many respects than that of June. The Punjab, Sindh, Cutch, the Konkan, and Orissa again exhibit more or less important deficiencies ; but in North Bengal and Behar, where last month a serious deficiency seemed impending, there has now been an almost compensating excess, and in the Deccan, Hyderabad, and Berars, though the excess of the present month does not make up for the deficiency of the last, there has at least been no further failure.

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The figures for the season, up to date, show that the rains have been unfavourable in two regions. One includes the Konkan, Khandesh, and the Bombay Deccan, where the amount of rainfall for the two months, June and July, has been only from 1/5 to ½ of the average amount, and the other the Punjab, where (though there are some exceptions) the general rainfall of the Province has been only ⅓ to ½ of the normal. In all of the country the seasonal average has been

There has [illegible] maintained.

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it at present stands.

cise application of [illegible] logical elements exhibit few variations were called upon [illegible] has been a pretty general excess of the ru[illegible] over [illegible] Peninsula, extending on the western side, Both [illegible] ward it. [illegible] and Rjputana, and a general deficiency alt[illegible] Northern and Central India. The temperature has [illegible]n above the average in the Punjab, the Central Provinces, Central India, Sind, Gujarat, and the Konkan, but generally below it in the peninsula and Burmah. The amount of humidity in the atmosphere has been below the mean in the Punjab, and has varied irregularly elsewhere.

WILD MANGOES.

(By C. Maries.)

The *jungli âm*, which is the original stock of all our fine mangoes, is not often met with in its native habitat, and less frequently in fruit. I have just received a few fine specimens of several varieties of jungli mangoes. From the fruits, it appears they vary quite as much as our cultivated ones; and as to shape, they are the exact counterpart in miniature of many of our best varieties. My specimens came from the Kangra valley, and were collected by a gentleman much interested in the fruit. I once saw the true *jungli* mango in the Douars, and again afterwards growing at an elevation of about 2,000 feet in Sikkim. It is very unlike the cultivated sort, having generally a straight trunk, whitish, smooth bark, and thin leaves, forming a fine, round-headed tree. The fruit rarely weighs 2oz.; often only one 1oz. The common country mango called "Beju" or "Desi," in Tirhoot, is really an inferior kind of cultivated mango, and not the proper wild mango of the forests.

Wild mangoes are found from India through Malay to Manilla and some of the Pacific islands, and it is not really known if there is more than one species. The wild and cultivated sorts are so widely different in shape of fruit, that they could almost be called distinct species, but every intermediate connecting stage may be found to bring them under one head. The flowers of the wild and cultivated mango are exactly the same in structure, except that in the wild one there are often more stamens fertile.

It may not be known to most people that generally in a mango flower there is only one stamen out of the lot fertile; this one is curved round just over the pistil in a peculiar way, to facilitate the fertilization. The so called "nak," or nose of the mango, is the place the pistil adhered to in the flower. All this can be plainly seen with a moderately powerful reading glass or lens when the mangoes are in flower.

Protecting Mango Fruit.

A very good way to protect mangoes from the attacks of birds and insects is get a lot of very finely-woven, round bamboo baskets made, say 4 inches wide at top, 5 inches at the bottom, and as long as may be required for the fruit; see that there is not room for a fly to get in through the basket-work. Then put the mango inside as it hangs on the tree, push a long thin peg through the top of the basket by the side of the stalk of the fruit on one side, and another similar peg on the other side, and the mango will hold the basket up itself; then tie a little calico over the top of the basket, taking care not to tie the mango stalk, and also to completely shut up the top of the basket. The mango stalk must be quite free, because when the fruit is ripe, or nearly so, it will fall of its own accord, and will be found to be just fit to gather. If a net be suspended under the tree, then all danger of bruising the fruit will be avoided. Then shake the tree to gather only the ripe ones. These should be kept on a "machan" for a few days till quite ripe, as all mangoes improve by keeping a little, and should never be eaten perfectly fresh from the tree.

CATTLE-DISEASE IN THE AMHERST DISTRICT.

The supplement to the *British Burmah Gazette* of the 15th instant contains the report of Mr. R. Frost, the Veterinary Instructor, British Burman, on the outbreak of cattle-disease in the Amherst District. We have gone carefully through this report, which brings to light some plain facts that ought to arouse public attention to a matter of such grave importance. We entirely agree with the conclusions arrived at, and the reasons given by, Mr. Frost in respect to the origin and spread of disease among cattle generally. That the water-supply is at the bottom of nearly every outbreak of epidemic among cattle, we have not the slightest doubt. Mr. Frost paints a *true* picture when he says: "What we generally find in these cases (tanks and *ins*) is that all the cattle of the locality have free access to the water; the buffalos wallow in it, *cattle and buffaloes dung and urinate in it.* As the weather gets warmer in April, rapid evaporation takes place, and in a short time the animals are compelled to *drink a concentrated solution of fæces, urine, and water.* This is not an exaggerated picture. It is a plain statement of facts as they have come under my own observation. When animals have been compelled to drink water of this kind for a short time, disease soon shews itself and spreads with alarming rapidity. Whether this was the case in the Kawkareik township, where the disease appears to have made its appearance first, I cannot state from my own personal knowledge, but from all I could gather, I am inclined to attribute the outbreak in the first instance, to this cause." [The italics are ours]. What Mr. Frost has brought to light here is perfectly correct. We have ourselves been witnesses of scores of instances in India where a tank or *jheel*, common to a village, was polluted by cattle being allowed to wallow, dung and urinate in it, and afterwards drink the same water. It is perfectly clear that the villagers are ignorant of the effects produced by allowing cattle to drink this water, and it therefore becomes patent every day that the Government should take imperative measures to remedy this state of things. The only way to bring about an improvement is by instruction. If any further proof were wanted of the need of instruction among the ryots, we have it in the following remarks by Mr. Frost in another part of his report:—

"The effects of the conduct of cattle-owners in connection with this disease (rinderpest) are much to be deplored, and the action of the owners of diseased cattle is such that incalculable injury is done in almost every instance. A plain statement of facts will prove the truth of my remarks. Disease make its appearance in a herd in a village, the owner takes no notice of the sick beast or beasts till an advanced stage of the malady, the sick and healthy are permitted to wander about together for several days, other members of the herd contract the malady, it then spreads to the herds of other cattle-owners of the same or neighbouring villages, for it is a common occurrence for the cattle of several villages to graze on the same *kwin*, each fresh herd that becomes affected becomes a fresh centre of disease. The discharges from the bodies of the affected cattle contaminate the pasturage which is enjoyed in common by perhaps hundreds of cattle, and they become infected in time. Animals are permitted to die in the jungle, and their bodies are allowed to rot where they fall, thereby contaminating the air for a considerable distance, and rendering healthy animals that breathe it liable to be attacked. In this disease the sick animals suffer from great thirst, and they generally find their way to the nearest tank, *in*, or creek. It is not an uncommon sight to find sick beasts standing in the tanks or *ins* common to the village herds, the discharges from their bodies mixing with and contaminating the drinking water, which in time produces the disease in those that partake of it. It often happens that the animal dies on the river's bank, the dead body is thrown into the water, and is carried away by the current; it is either carried out to sea, or is left high and dry on the river's bank miles away, where it becomes a fresh centre for the spread of the malady."

This is a horrible picture, but it is true nevertheless, and is as much applicable to India as to Burmah. Mr. Frost remarks that "there is no doubt that this state of things is due in a measure

to the want of knowledge of remedial agents o
ordinary cultivator ; but it cannot be denie
frequently the result of apathy and indiffe
ble of catching the sick, and of administering
nourishment, is considered too great to in
exert himself to such an extent." He
that it is the crass ignorance that prevails a
and owners of cattle generally that leads to such disastrous results. It is for agricultural departments and district and revenue officers to promulgate such practical knowledge among these ignorant people as will open their eyes to the great risks involved in permitting diseased cattle to herd with the healthy. Once they are convinced, that it is *to their interests* to avoid this, some satisfactory results might be looked for.

Mr. Frost's report is one of the most practical and unvarnished narratives of the kind we have read, and we have reproduced it *in extenso* elsewhere. It is very important, and should be read by every one interested in the welfare of Indian stock.

COTTON CULTIVATION IN UPPER INDIA.

It will interest agriculturists in other parts of India to learn that *cotton* is raised by *irrigation* in the N.-W.-P., where it is practically considered to be a *wet* crop. From experiments carried out at the Cawnpore Agricultural Station during the *kharif* season of 1884, some interesting facts may be gleaned relative to the manuring of cotton-land, sowing seed, cropping, and exotic cottons. In the first place it is necessary to bear in mind that the *kharif* are the rainy-season crops sown in June and July, and harvested in September or October. The manure used was either *cowdung* or *poudrette* at the rate of 200 maunds to the acre. Poudrette takes the lead in productive outturn. It is worth knowing that *woollen refuse* from the mills has been tried as a soil improver with satisfactory results. Its price on the spot is 4 annas a cart-load, or Rs. 1-4-0 per 100 maunds, which is only half the price of poudrette charged by the Cawnpore Municipality. But the Director of Agriculture is of opinion that cowdung is perhaps, after all, the cheapest and most profitable fertilizer, as it is certainly the manure most readily procurable by Indian cultivators. From published details of the ploughing done at the Agricultural Station during the past *kharif* season, we learn that the comparative value of ploughing, as done by ordinary country ploughs and with earth-turning ploughs, 5 and 9 inches deep, shows decidedly in favor of the latter, notwithstanding the fact that the ground was twice turned under the first-named implements. The advantage of a thorough inversion of the soil over mere scratching, not only implies a larger outturn for labor worked, but economy in the long run of agricultural operations. It is not a little surprising to learn that the country method of broad cast sowing produced a much larger outturn than ridge-sowing. This is attempted to be explained in the reports by the fact that when sown broad-cast, the plants being much closer when dropped in lines, keep down weeds which have more scope under the latter arrangement, and soon quite overpower the plants. It is interesting to know that sowing in ridges gave a better yield than either on the slopes or in the hollows between them. But these results cannot, from the limited experiment, be considered as final. Cropping the plants for a second year gave inferior results to those obtained from the same field in the succeeding year, and to the cotton gathered from fields sown this year, with similar varieties of co It is therefore a distinct disadvantage to take two crops of cotton from the same plant ; and when we consider that the value of cotton seed is so very low, and the labour so very cheap in this country, the advantage of keeping the crop on the ground for a second year, which will only give an outturn equal to one-fifth or one-sixth of that of the preceding year, is practically *nil*. The ground, moreover, loses considerably by the rest—so to speak. The course suggested by the Assistant Director as best is, that after raking one crop, to plough up the land, and leaving it in open furrows till the next season for sowing. The attempts made to introduce exotic cotton have not met with the success that was anticipated.

Cotton failed from circumstances whic here were no
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FODDER.

In this age of "silos" and "ensilage," too much cannot be said in favor of proposals to encourage the cultivation of fodder crops in the rural economy of India—particularly in those localities where there is but little pasture. Starvation and ill-regulated feeding has more to do with cattle deterioration in this country than climate ; and any attempt towards improvement can only prove futile until the people learn to feed their cattle better. There is no question of greater importance, socially and fiscally, from a political stand-point, than the preservation and improvement of indigenous cattle in India—for draught and farm-work. Wholesale reform is necessary to improve the condition more than the breed of cattle nearly all over the country ; and this can never be effected until it can be proved to cultivators, that it will pay them equally as well to bestow the same care in the cultivation of fodder crops, as in that of grain. The superiority of the breed of cattle in the Punjab is ascribed to the fact that the custom is all but universal there to grow certain crops for no other purpose than for feeding cattle. The same plan followed in other provinces could only lead to that improvement which better treatment must bring about, and which is so desirable for the agricultural requirements of an agricultural population. The *poverty* of the ryot is the great obstructive factor, and has more to do with retarding advancement than ignorance and prejudice combined. He can ill-afford any share of his small plot of ground for "experiment,"—as raising fodder would, at first sight, appear to him as well as others round and about him. The solution of the difficulty resolves itself into one word—"encouragement." He will concede that his cattle need better food and better care ; and the incumbent duty of those most concerned—responsible for his well-being, pecuniarily and morally—is obviously "concession" and "instruction." With inducements given and benefits explained him, the cultivator would not be such a fool to his own interests as to neglect the opportunity. The inducement referred to is land free, or at a reduction of rent ; and the instruction necessary to enable him to "see and judge" for himself of the advantages to be derived from its cultivation with fodder, could best be imparted through model farms established at centres easy of access in every district or zemindary. He would there learn what fodder would be best to raise for his animals, or even for *sale*. The best suggestion that comes to us relative to teaching the people that fodder cultivation is profitable, is that for the establishment of fodder farms at all cantonments, for the wants of cavalry and artillery horses—where there would be a *constant, remunerative*, demand for a large supply of fodder of the best kind. An authority on this matter says : "Hay and artificially grown fodder in cantonments would be invaluable in supplying the wants of the cavalry, artillery, and slaughter cattle. A farm for such crops would be plentifully supplied with manure by conservancy sweepings, cavalry and artillery horse-litter, and commissariat and slaughter-house refuse." This would prevent the depredations of grass-cutters, who trespass into village lands and carry off fodder that is barely enough for the wants of village cattle. The saving that a fodder-farm would effect by a large reduction in the establishment of grass-cutters would, in itself, be a item well worthy the attention of military economists. Besides, the possibility of having to remove horses into camps many miles from cantonments, in search of grass during periods of drought or scarcity, would be averted. The present utter neglect of the military

There ha this respect has been justly censured "not only retention o n policy," but as "unworthy of a great Military it at prese great inducement towards the establishment of a cise app m would be, that soldiers might find it worth their were ca work in it; and that it would be a beneficial means the ru g a certain number of them to usefully occupy much Both idle time.
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Miscellaneous Items.

The mango crop at Goa was not so scarce as it was tardy. It is reported that the bazaar at Mapuca abounds with mangoes as big as they are sweet, at a hundred per rupee of the best sort.

It is notified in the last number of the *North-West Provinces Gazette* that, subject to certain modifications, section 50 to 55A of the North-West Provinces Rent Act, 1881, shall be in force in the Family Domains of H. H. the Maharaja of Benares.

A new industry has been created at Mahé by an enterprising French gentleman. This consists in the curing and packing of small fish resembling sardines. These fish are despatched to France, and doubtless again find their way out as the genuine article.

We hear that owing to very heavy rains in the Cuddapah district, the bund of the Cuddapah-Kurnool Canal has given way, and the water from the Canal and from the river Pennar has submerged two villages about twenty miles to the north of Cuddapah.

The Forest Commission recently appointed by the Bombay Government will be formally opened by H. E. the Governor in the Council Hall at Poona on Thursday next. After the formal opening at Poona the Commission will re-assemble on a date to be fixed hereafter at Thana.

The details of the reorganisation of the Veterinary Department, in special connection with the proposed Civil Veterinary Department, are now being worked out at Simla by a special committee, consisting of Colonel Hunt, Colonel Low, Colonel Bushman, Major Deane, and Messrs. Hallen and Olliphant.

The total number of cocoanut trees licensed for "toddy-drawing" in the town districts of Pondicherry for the year 1885 is 4,232 and of palmyra trees 4,903, producing an aggregate revenue to the State of 26,376,54 francs, or, at 206 per rupee, Rs. 12,804. The tax on each cocoanut tree is 5·18 francs per year and on palmyra trees from 25 to 75 centimes per year.

The Pondicherry Government is engaged just now in distributing small sums of money among the poor of the town and suburbs who lost their huts during the late floods. The delay in the distribution of the charity was due to the want of funds, but the late grant of the Home Government of half-a-million of francs has placed the local administration in comparatively easy circumstances for the time being.

The cultivators, about one thousand in number, who went to Poona to lay before his Excellency the Governor their grievances in connection with the stringent working of the forest laws, have returned to their respective villages. In reply to their petition, they were informed that they will have to appear at the forthcoming sittings of the Forest Commission, by the members of which body their grievances and complaints are about to be examined into.

We hear that the Madras Tenancy Bill, which was under consideration for several years and unfavourably commented upon by most revenue officers, has been given up, and the subject again referred to a Committee, of which, among others, Messrs. F. Webster, P. Chentsal Row, and Hon'ble S. Subramania Iyer are members. We hope that the new Committee will be able to produce a Bill calculated to meet with better reception from the Revenue officers of the Government and from the public in general.

A few cases of cow-killing by poison have come to light at Rawal Pindee. Some strong poison mixed either with little dough or lump of rice was given to a cow, at graze or at the cow-stall, and the consequence was that in about half an hour after the poisoned food had been eaten, the cow died from the effects of the poison. A fit of convulsion at first overtook the victim, and a quantity of bluish foam issued from the mouth before death. The cruel agents of this nefarious practice of killing cows by poison are supposed to be men employed by the contractor who had paid a certain sum of money to Government for permission to utilize the hides of dead kine. A *post-mortem* examination was held on one of the poisoned cows, and the poison was extracted from the stomach. Some of the culprits are awaiting trial to the Cantonment Magistrate's Court. We postpone our remarks as the case is *sub-judice*.

We learn that the Madras and South Indian Railway authorities are having photographs taken of the large bridges and other large works on their respective line to be forwarded to the forthcoming Colonial and London Exhibition. Of those selected on the Madras line are the Central Station, the Ballipally and Tiger Rock cuttings, and the bridges over the Pennar, Palar, Huggery, and Chittravuthy; and those on the South Indian line are the bridges over the Palar, Gingee and Cauvery, and the workshops at Negapatam.

The first sitting of the Abkari Commission [illegible] held lately at the Secretariat, under the presidency of Mr. J. H. Grant, Collector of Bombay. Eduljee Dossabhoy, one of the representatives of the licensed country liquor sellers of this city, who gave his evidence before the Commission, said that the system of selling licenses by public auction was attended with great evils. It introduced an element of harassing uncertainty in the trade, and took away largely from the incentive to fair dealing and respectability, which could only be afforded by a sense of security and stability in their business. He maintained that the public sales bore heavily on the liquor-sellers, and that although there was at present an increase in the Government revenue, a reaction must set in, and in the long run the Government themselves would suffer. He suggested that the auction system should be abolished, and the license fee should be fixed on a fair and reasonable basis. There was a large attendance of liquor-sellers, who watched the proceedings with great interest.

Selections.

CATTLE-DISEASE IN THE AMHERST DISTRICT.

The subjoined report of Mr. R. F. Frost, Veterinary Surgeon concerning cattle-disease in the Amherst district, is published for general information. The attention of District Officers in other parts of the province is invited to the need for improving the water-supply of cattle, for insisting on the burial of bodies of diseased cattle, for restricting, as far as may be, the movement of cattle within and from tracts affected by rinderpest. The Chief Commissioner has recently advised the Government of India that a Cattle-Disease Act, somewhat on the model of the recent Madras Act, is required for Burmah. The Act would be extended to any part of the province on cattle-plague appearing, and could be withdrawn from such tract as soon as the scourge abated.

From R. F. Frost, Esq, A. V. D., Veterinary Instructor, British Burmah, to the Deputy Commissioner, Amherst,—No. 3389, dated the 3rd August 1885.

I have the honour to report for your information the result of my inquiries into the recent outbreak of disease among the cattle of your district, and to acquaint you with the result of my inspection of the Veterinary Assistants employed under you

II.—Nature of the disease.—The disease from which the cattle have died was true rinderpest, a disease which is highly contagious and infectious, and which plays sad havoc among the herds of this province almost every year. The terms used by Burman cattle-owners to indicate disease are "blood-purging" and "smallpox." When severe enteric symptoms show themselves, they use the term "blood-purging," and when an eruption appears on certain parts of the skin of the body accompanied by mild derangement of the bowels, the term "smallpox" is applied to the malady. Of these two forms of the disease the latter is the least fatal. Many recoveries take place when a copious eruption takes place, while only a very small percentage recover when the enteric symptoms are well marked. It is very rare that the eruptive form is met with among buffaloes, and even in cattle, only a very small proportion of those attacked show this peculiarity of the disease.

III.—Cause of the outbreak.—I have been unable to glean any facts that would justify a positive assertion as to the origin of this recent outbreak. Such a long time had elapsed between the first appearance of the disease and my arrival at the scene of the outbreak, the difficulty in obtaining any reliable evidence as regards facts or dates from cattle-owners, facts that would aid me in tracing the disease step by step to its origin, and the utter indifference of the people in the matter of the loss of their cattle, have rendered it impossible for me to state where the disease originated, much less to offer an opinion as to its cause.

That the disease spread rapidly owing to its contagious and infectious character there can be no doubt, but there was not the most remote chance of being able to obtain a clue as to where the disease first showed itself.

But although I am unable to enlighten you as to whether the disease on this occasion arose spontaneously and had its origin within your own district, or was introduced by foreign cattle, I may be permitted to add that I am strongly of the opinion that there are sufficient causes in operation as affecting the health of the cattle of your district, as well as almost every district in the province to give rise to this dreadful disease. That the disease may have been introduced by drovers' cattle entering the district *viâ* Myawadi is, of course, quite possible, but there is nothing to be gained by speculating on this part of the question now; there is no reliable evidence available to prove that it was introduced by them.

The conditions necessary for the maintenance of the health of cattle are very intimately connected with their food, their drinking-water, and the shelter supplied to them.

If any of these three conditions are wanting, the health of the cattle must suffer more or less. Shelter may be dispensed with without any serious injury, a scarcity of fodder may be experienced without any more serious consequences than a loss of flesh and an increased predisposition on the part of the animal to attacks of disease, but an impure or an insufficient water-supply is generally followed by the most fatal consequences.

It is a well-established fact that when animals are compelled to drink bad or impure water, they are rendered specially liable to disease of a putrid and of an enteric character. Bearing this in mind, I shall now ask you to recall to your memory the sources of the water-supply of the cattle of those parts of the province where you have served. Take Hanthawaddy, Pegu, Thongwa, Bassein, Tharrawaddy, Prome, Akyab, and Henzada districts as examples of what I wish to impress upon you. I select these districts because I desire to allude to such places only where I have had an opportunity of studying the water-supply for cattle during those months, when it is so absolutely necessary and when it is so very scarce, and that is from March to the commencement of the rains. I [illegible] that cattle herded in the vicinity of large rivers and streams where the water is sweet are favourably situated, but my remarks do not point to these cases. I allude to those localities where the cattle have, owing to the presence of brackish water, to depend upon tanks and *ins* for the water which they drink.

What we generally find in these cases is that all the cattle of the locality have free access to the water, the buffaloes wallow in it, cattle and buffaloes dung and urinate in it. As the weather gets warmer in April, rapid evaporation takes place, and in a short time the animals are compelled to drink a concentrated solution of fæces, urine and water. This is not an exaggerated picture. It is a plain statement of facts as they have come under my own observation.

When animals have been compelled to drink water of this kind for a short time, disease soon shows itself and spreads with alarming rapidity.

Whether this was the case in the Kawkareik township, where the disease appears to have made its appearance at first, I cannot state from my own personal knowledge, but from all I could gather, I am inclined to attribute the outbreak, in the first instance, to this cause.

The Sanpannago circle of the Martaban township is one of the great grazing-grounds for that part of the country, and, in reply to inquiries of mine, Mr. Hough informed me that the description which I have given above of the drinking-water generally available for cattle describes the character of the water which is available for the herds collected in many parts of his subdivision and of the cattle in Sanpannago circle in particular.

I have only to add that a very serious outbreak of rinderpest occurred in the month of April among the herds collected in the Sanpannago circle.

The prevailing opinion with regard to this disease is that it is due to the consumption of large quantities of fresh, innutritious, green grass, which springs up so luxuriantly at the commencement of the annual rains. Such a theory cannot be supported in connection with the recent outbreak in your district for the reason that the disease had made its appearance, and had swept away thousands of animals before the rains set in.

I could point to several other instances where outbreaks have had no connection whatsoever with the advent of the monsoon or the consumption of green grass.

IV.—Area involved in the outbreak.—The disease has extended over a very considerable part of the district. The whole of the Kawkareik township has been involved, and the [illegible] been remarkably high in this township.

The south-eastern part of the Hlaingbwe township [illegible]ere were no [illegible] oxen were a good deal, especially the Dawlan circle, where, I was [illegible]e to either every village suffered more or less. [illegible]d by culti-

Gyaing-Salween as well as Gyaing-Ataran townships h[illegible] June or [illegible], is that lost heavily, while Balugyun, Martaban, and Thaton hav[illegible]gyi was ed but not to the same extent. It is highly probable th[illegible]is take the real facts of this outbreak could be ascertained, and if [illegible]mpile rate figures were forthcoming, we would learn that the dise[illegible] few the had spread over a much larger area, and that a much larger num[illegible]r's ber of deaths had taken place.

V.—Treatment of sick animals.—It may be said that no efforts are made by the cattle-owners to save the lives of their sick beasts, several days are allowed to elapse before any attention is paid to the sick animal. It is not till the disease has been fully developed, till purging has set in, and there is a complete disinclination to eat, or until the animal becomes so weak that he cannot stand, that the attention of the owner is aroused; even then little or nothing is done beyond bringing the patient in from the kwin, tying him under the owner's house, where the poor beast has often to stand in filth fetlock deep, and being then subjected to a most barbarous method of treatment in having a mixture of salt and chillies, or salt and onions, placed in the mouth, nostrils, and eyes. No endeavour is made to support the strength of the animal. A little grass, which the beast will not touch, is placed before him, and nature is allowed to do the remainder, which it generally does by putting an end to the poor beast's suffering.

There is no doubt that this state of things is due in a measure to the want of knowledge of remedial agents on the part of the ordinary cultivator; but it cannot be denied that it is more frequently the result of apathy and indifference. The trouble of catching the sick, and of administering medicines and nourishment, is considered too great to induce the owner to exert himself to such an extent.

VI.—Preventive measures resorted to by owners.—The effects of the conduct of cattle-owners in connection with this disease are much to be deplored, and the action of the owners of diseased cattle is such that incalculable injury is done in almost every instance.

A plain statement of facts will prove the truth of my remarks. Disease makes its appearance in a herd in a village, the owner takes no notice of the sick beast or beasts till an advanced stage of the malady, the sick and healthy are permitted to wander about together for several days, other members of the herd contract the malady, it then spreads to the herds of other cattle-owners of the same or neighbouring villages, for, as you know, it is a common occurrence for the cattle of several villages to graze on the same kwin. Each fresh herd that becomes affected becomes a fresh centre of the disease. The discharges from the bodies of the affected cattle contaminate the pasturage which is enjoyed in common by perhaps hundreds of cattle, and they become infected in time. Animals are permitted to die in the jungle, and their bodies are allowed to rot where they fall, thereby contaminating the air for a considerable distance and rendering healthy animals that breathe it liable to be attacked.

In this disease, the sick animals suffer from great thirst, and they generally find their way to the nearest tank, in, or creek. It is not an uncommon sight to find sick beasts standing in the tanks or ins common to the village herds, the discharges from their bodies mixing with and contaminating the drinking-water, which in time produces the disease in those that partake of it.

If it so happens, as it often does, that the animal dies on the river bank, the dead body is thrown into the water and is carried away by the current; it is either swept out to sea, or it is left high and dry on the river's bank miles away, where it becomes a fresh centre for the spread of the malady. These dead bodies, in being carried about by currents, frequently come in contact with herds of buffaloes drinking at the river's side, and I need not add that the water contaminated by these dead bodies, if partaken of by healthy animals, is very likely to convey the disease to them.

In my recent journeys through your district this matter was forcibly impressed upon me, particularly on my way up the Gyaing river, where, in a distance of about 10 miles, I counted 33 dead bodies of animals either floating down with the stream or enclosed in weirs as bait for fish.

Matters must have been even worse prior to my visit, for I was told by villagers up the Haungtharaw that, owing to the number [illegible]at were floating up and down that river with the [illegible] had to discontinue the use of river water fo[illegible] [illegible]me.

THERE has [illegible] retention o[illegible] to the ill-effects of allowing the dead bodies to rot in it at prese[illegible]d thereby contaminate the atmosphere, there is an- cise app[illegible] still more forcible, objection to this method of disposing were ca[illegible]es. Birds of prey and dogs that have feasted on the the ru[illegible] is a well-established fact, become powerful agents in Both[illegible]g the contagion of the disease to considerable distances. alt[illegible] people were to combine with the object of spreading the n[illegible]se as much as possible, they could hardly be more successful [illegible]heir efforts than they have been. Not alone is nothing done to check the disease, but everything is done to facilitate its extension. Sick cattle are turned loose to mix with the village herds, the drinking-water is contaminated by them, the pasturage is made a fruitful medium for conveying the disease, cattle are moved from infected to healthy localities regardless of the fact that disease prevailed amongst them. Indeed, worse than this, I have been informed by men that they have bought cattle from diseased herds for low prices, and removed them to other localities in hopes that they may escape infection, or if not that, the loss of even half the animals purchase would leave the price of the remainder still below their market value. A remarkable example of this came under my notice at the village of Khaya. A cultivator purchased two buffaloes at the village of Pata, in the Dawlan circle, in the month of April. He was well aware of the fact that rinderpest prevailed among the herds at Pata at the time, but the low price (Rs. 30) at which the pair of buffaloes was offered to him proved too great a temptation, and he became their owner. In a week after his return to his own village (Khaya) one died, and in a few days the second was carried off. Previous to this not a trace of the disease was noticed among the herds in Khaya, but soon the disease spread from herd to herd until, at the time of my visit, not a herd in the villages of outer and inner Khaya had escaped. I have not the slightest hesitation in stating that a large trade in diseased, or perhaps what I ought to term suspicious, animals, is done during the prevalence of an epidemic of rinderpest, that this trade helps in a great measure to spread the disease, and that incalculable loss is caused thereby.

The flesh of animals that have died from rinderpest is exposed for sale, or it is cut up in strips and hung up to dry, sometimes close to where the healthy cattle are tied, and it is a common sight to behold the hides taken *from the* dead bodies piled up in close proximity to the living animals.

The unrestricted movements of cattle through the country during the prevalence of an outbreak must always prove a most important factor in spreading the disease. Some facts, which came to my knowledge while travelling in the Martaban township, will verify this statement. Large numbers of cattle used in cultivation on the Martaban plain are put out to graze annually in the Sanpanago circle. They are brought back each year immediately before the commencement of the ploughing season. This year disease made its appearance among the herds in the Sanpannago circle some time in April or early in May. In a short time the cultivators removed their herds amongst which the disease had established itself, and in a short time almost every village from Martaban to Yinnyaing was a centre of the disease.

Although I have been unable to gather any trustworthy information on the point, I have little doubt in my own mind that drovers' cattle passing through the Kawkareik township during the prevalence of the outbreak did considerable mischief in aiding the spread of the disease. Large droves of oxen and buffaloes pass through Kawkareik every year. They halt for some time at Kawkareik, where large numbers are disposed of, and then move westwards towards Thaton, Ky[illegible]kto, Pegu. Hanthawaddy, and Thongwa, and other places. This year large herds were at Kawkareik during the prevalence of the disease, and it is only reasonable to suppose that they did not escape infection. Indeed I have been frequently told that these herds suffered severely both during their sojourn at Kawkareik and on the march through the township. That disease prevailed in those herds may be inferred from the circumstance that the drovers were willing to dispose of their animals at prices much below the usual market rates. These herds, in their progress through the province, mix freely with the cattle of the different villages, they frequent the large grazing grounds, and halt for days where grazing and water are abundant. If disease prevails among these herds, it is not difficult to understand the vast amount of harm that they are capable of doing; not alone are herds en route infected, but animals purchased from the drovers and taken to villages at considerable distances, as is the case, convey the disease to their new homes, where it spreads with fatal rapidity.

I have here stated facts as they have actually taken place, and I think my assertion, that nothing is done to check the disease but everything is done to facilitate its extension, is fully borne out by those facts.

VII.—*Indifference of Township Officers in the matter.*—As a rule the Township Officers paid little or no attention to the recent outbreak. The Hlaingbwe Myook paid a hurried [illegible] to the village of Dawlan when the disease had been raging for some months. He issued an order to the Dawlan taik-thugyi in the month of May to the effect that the bodies of all cattle that died were to be buried immediately, and that any person disobeying this order would be dealt with under section 188 of the Indian Penal Code. Putting aside altogether the legality of the order, which I believe is open to considerable doubt, I may state that no action was taken to ensure the observance of the order.

The Township Officer of Gyaing-Salween seemed to take no interest whatsoever in the matter. He was aware of the fact that disease prevailed at the village of Khaya, but he had not been to the scene of the outbreak. He informed me that there had not been any sickness in his township during the year with the exception of this outbreak at Khaya. He was quite ignorant of the fact that disease prevailed among the herds at Sanle and Kawlamu. It appears that there was a serious mortality among the cattle in Zathabyin village about February and March, yet the Myook seemed to know nothing about it.

The Township Officer of Kawkareik has taken no active measures to obtain statistics of the number of deaths which have taken place. This officer has directed that taik-thugyis are to submit weekly reports of the number of deaths of cattle, yet in the face of this order he accepts monthly reports instead. At the time of my visit to Kawkareik I learned from the Myook that a large number of deaths had taken place in the Myewadi circle, and on asking for the returns I was informed that none had been received.

The same indifference prevailed in the Gy[illegible]-Ataran township. Deaths were reported from Pabyauk, Payogyi, and [illegible]adaing, but a large number of animals died in the Migalon circle about which the Township Officer knew absolutely nothing. The impression left on my mind after conversing with the Township Officers on this subject was that it was one which gave them very little concern. They one and all tried to shift the blame, whenever blame was due, on to the shoulders of the taik-thugyis, and they seemed to think that all they had to do was to forward such reports as they may receive from the taik-thugyis to the district office.

VIII.—System of reporting outbreak by taik thugyis.—I cannot write too strongly of the manner in which the present system is worked. During the whole time that I have been engaged inquiring into this recent outbreak, I have not found a single instance of a reliable report having been made by a taik-thugyi. These men, as a rule, took no action in the matter till the disease had obtained firm hold of the herds in their circles. In some instances they were in perfect ignorance of the prevalence of the disease.

I shall quote a few examples. The Dawlan taik-thugyi admitted to me that disease prevailed in about 11 villages in his circle, and that at least 1,000 animals had died from March up to the end of June. He reported 220 deaths as having occurred in the villages of Dawlan and Kyeikpaw, which almost adjoins Dawlan. He informed me that he had made no efforts to ascertain the number of deaths in the other villages of his circle.

The thugyi of the Myapadaing circle, although he resides at Kyundo, knew nothing about the prevalence of disease in the village were he resides. A large number of cattle died in Kyundo, one Karen having lost about 50, yet the taik-thugyi never reported deaths from Kyundo nor did he know that disease prevailed at the time of my visit.

The villages of Thayettaw, Kanni, and Kyaing in the Migalon circle suffered a good deal, yet the taik-thugyi knew absolutely nothing about the mortality until I enquired about the facts.

On comparing last year's return of the number of buffaloes and cattle in the circle with the return for the present year, I found that there were 482 buffaloes, cows and bullocks less in the circle this year than there were last year. The taik-thugyi explained this difference by stating that this year many natives of India came up to Migalon to purchase cattle, and that they took them away to Moulmein. I am inclined to think that he would have found a more correct explanation of this falling off of over 35 per cent of the cattle in his circle, if he had made himself acquainted with the number of deaths that took place during the months of March, April, and May.

I might quote several cases of a similar kind, but I shall confine myself to one other, that of the Mukyit taik-thugyi. An owner of a sick buffalo was told that, if she reported the matter to the Mukyit taik-thugyi, veterinary medical aid would be supplied by Government. The woman sent her son to Kwechan village to inform the taik-thugyi that her buffalo was ill and to ask for assistance. On reporting the circumstance the boy was told by the thugyi to report the matter to the kyedangyi, and that was all the veterinary medical aid the woman received for her cattle.

Subsequent to this I visited Kwechan, where I found cases of rinderpest, but the thugyi knew nothing about the matter. He was ignorant of the fact that the disease prevailed in his own village, and he told me that all he had to do in the matter was to make an abstract of the kyedangyi's returns and submit it for the information of the township officer.

In those cases where the taik-thugyis have failed to make themselves acquainted with the state of the health of the cattle in villages in their circles, and where I found that disease had prevailed but deaths had not been reported, the thugyis invariably put the blame on the kyedangyis, who, they say, cannot be got to report deaths. I have inquired into many of these, and I have found almost in every case that the kyedangyis have never been ordered to report the deaths of cattle. They say it is their duty to collect statistics relating to deaths among the people, but that they have nothing to do with furnishing information regarding the death of cattle.

The kyedangyi of Kanni went so far as to say that he mentioned, in a casual kind of way, to the Migalon taik-thugyi that cattle were dying in his village, but that the taik-thugyi did not direct him to collect any statistics as to the number of deaths.

IX.—Value of statistics.—Much doubt has been expressed by officers as to the utility of collecting even approximately accurate figures of the number of animals that have died during the recent outbreak. To my mind it is a matter of vital importance, and if we could collect reliable information regarding the number of deaths that have actually taken place, we would find that a very serious loss has been sustained by cattle owners generally. Taking a broader view of the matter, I am convinced that thousands of cattle die annually in British Burmah from preventible disease, and that owing to the generally defective system of reporting deaths, District Officers must remain in ignorance of the magnitude of the annual loss suffered by cultivators.

From the facts which have come under my personal observation, I am deeply impressed with the great necessity that exists for the introduction of legislative measures, with the view of checking the spread of this dreadful plague among the herds of the province, but until I can prove by figures that a necessity exists for the introduction of legislative measures, my recommendation and my warnings must possess but little force. But were reliable figures forthcoming, I am sanguine that I would be borne out in my views, and that then the Government would be made acquainted with a state of affairs of which it can form no adequate idea at present.

The following figures will give some idea of the high rate of mortality. The figures show the number of animals in 12 villages of the Myapadaing circle of the Kawkareik township, and the number of deaths reported from each village during the months of May and June of the present year :—

	Number of buffaloes in village.	Number of bulls, cows, and oxen in village.	Number of buffaloes died.	Number of bulls, cows, and oxen died.	Buffaloes, Percentage of deaths.	Bulls, cows, and oxen, Percentage of deaths.
No. 1	277	30	112	34	40·43	..
,, 2	75	78	45	44	60·0	57·58
,, 3	193	87	101	40	52·33	45·98
,, 4	337	43	106	38	31·45	88·34
,, 5	578	..	94	14	16·26	..
,, 6	25	373	..	245	..	65·48
,, 7	394	116	195	95	49·49	81·89
,, 8	606	2	176	..	29·04	..
,, 9	320	..	57	2	17·81	..
,, 10	218	..	190	12	87·15	..
,, 11	296	75	202	60	68·24	80·0
,, 12	323	..	120	7	37·26	..
Total	3,640	892	1,398	640	38·13	71·74

These figures must be considered as only approximate. The figures in the second and third columns have been taken from the return of the number of animals collected last year by the taik-thugyi. In some villages you will observe that there were no cows, bulls, or oxen, yet deaths of cows, bulls, and oxen were reported during the recent outbreak. This may be due to either of two causes ; one, that cattle may have been purchased by cultivators subsequent to the collection of these statistics in June or July last year ; the other, and the most likely explanation, is that the annual return of animals as submitted by the taik-thugyi was not correct. I think I am right in stating that taik-thugyis take little or no trouble in collecting these statistics. They compile their returns upon the information which they collect from a few men from each village, or the kyedangyi is deputed to collect the figures. I shall give you a case in point. According to last year's return there were 28 buffaloes, two cows, and one ox in the village of Kyaing in the Migalon circle ; according to the return for the present year there are neither buffaloes, cows, nor oxen in the village, yet I found 20 head of cattle there when I visited the village, and these animals had been in the village for years.

But although the figures may not be accurate, I think they are strong evidence of the fact that a very heavy burden has fallen on the people, and I am quite certain that other circles have suffered equally, but there are no figures available to show to what extent they suffered. For example, in the month of May, 1,044 buffaloes, cows, and oxen were reported as having died in the Kawkareik circle during the month of April. Again, in the next 15 days of May, 2,310 animals were said to have died in 12 villages of the same circle. After this no deaths were reported. This shows that 3,754 animals died in the Kawkareik circle alone. I may here add that I was informed by the kyedangyi of the natives of India residing in Kawkareik that he had not, previous to my visit, reported any deaths from among the cattle of natives of India. He furnished me with a return which showed that 27 natives of India had lost, during the recent outbreak, 335 cows, bulls, and oxen and 33 buffaloes. This shows that 4,122 animals died in the Kawkareik circle alone ; and if we add the number of deaths reported from the Myapadaing circle (2,038), we have a total of 6,160 deaths in these two circles. I am unable to state how many deaths have taken place in the other circles of the township, but I was informed by the township officer that disease prevailed in the other circles of his township, but that he had not received any reports from the taik-thugyis.

I would wish to allude here to some figures which I was enabled to obtain of cattle deaths in the Hlaingbwe township during the prevalence of some previous outbreaks.

In the year 1882 I find that in six circles of the Hlaingbwe township 2,154 animals were reported to have died between the 15th May and the 1st September.

In the year 1883 the records show that 6,415 animals died between the 15th March and 15th September.

Certain quarterly records for 1883 show that 8,161 animals died during the prevalence of a severe outbreak of rinderpest in this year.

There are no records for the year 1884. Taking the lowest figures, we find that in this one township alone over 8,000 animals were swept away in two years, 1882-83. This represents a money loss of about Rs. 2,00,000 to the cultivators of the township, and the money loss caused by the recent outbreak in the two circles of the Kawkareik township may be said to amount to about Rs. 1,50,000.

In the absence of reliable statistics you will understand how difficult it is to even hazard a statement as to the value of the cattle that died during the present year. We know that the disease prevailed in six townships of the district, and, if we bear in mind the highly contagious and infectious nature of the malady and the facilities afforded by cattle owners for its spread, we many feel confident that the money loss has been enormous.

My object in alluding at such length to this part of the subject is to show that if reliable information could be obtained as to the number of deaths that take place on occasions of epidemics, strong grounds would be established for asking for some legislative measures to deal with outbreaks.

X.—Veterinary Assistants and the outbreak.—I am very sorry to be obliged to add that these young men have been of little or no use in connection with the recent epidemic.

The Veterinary Assistant Maung Po Khin, employed under the Assistant Commissioner, Thaton, fell sick just at the time when his services were most needed, and when Mr. Hough ordered him to go to the scene of an outbreak in the Thaton subdivision. Notwithstanding that the Medical Officer certified that the man was fit for duty he flatly refused to obey Mr. Hough's orders, on the plea that his constitution would suffer if he exposed himself to the vicissitudes of the season. This man has been suspended, and he will not be further employed in your district.

The conduct of Maung Shwe Dwe, employed under the Township Officer, Kawkareik, has been most discouraging. This assistant, notwithstanding that disease has been raging all round him for months, has done absolutely nothing. For months he has been sitting in his house at Kawkareik, and this too with the knowledge of the Township Officer. On asking the Myook why he did not order the Veterinary Assistant to go about and endeavour to induce the people to adopt some measures of precaution against the disease, he informed me that he had not seen the boy for two months, that he believed he was all the time in his house in Kawkareik, that if he had sent him out the people would not follow his advice, that the cattle were all wild and could not be caught for the purpose of giving them medicine, and that the people would only laugh at any advice which the Veterinary Assistant may offer with regard to the adoption of preventive measures.

I think the Township Officer might have seen that the Veterinary Assistant did not idle away his time in the manner I have stated. Had he taken an interest in the boy's work, some useful information might have been obtained regarding the extent and mortality of [illegible]ce disease. Besides, it is on occasions of epidemics like this, to which I allude, that these Veterinary Assistants have it in their power to bring themselves to the favourable notice of cattle owners, not so much in the treatment of sick beasts, as in the prevention of disease. But if Township Officers allow these young men to be to a certain extent their own masters, I see very little chance of getting them to do any useful work.

The Veterinary Assistant Maung Tha Dun Zan, employed under the Myook of Hlaingbwe, endeavoured to do his best in connection with the outbreak at Dawlan, but he could do little owing to the difficulty of inducing the people to follow his advice. Although this boy was supported by all the influence which the Township Officer possessed, and although the Township Officer accompanied him to the scene of the outbreak, still he was able to do little or no good. The people would not go to the trouble of catching the sick cattle for the purpose of giving them medicine, they would not segregate the sick from the healthy, they would not bury the dead, or prevent the healthy animals from coming in contact with the dead bodies. In a word, the boy could not induce the people to follow his advice in even the most simple matter, and the result was the youth became quite disheartened and ceased to advise the people.

The other Veterinary Assistant, Maung Tun Baw, has not been spending his time very satisfactorily. It is true he did not hear of the existence of disease in Balagyun and Gyaing-Ataran till the disease had been for some considerable time in existence, and he could then do very little good. This young man did not impress me very favourably. He is a smart, intelligent youth, but he is very lazy, and he appears to think more of making travelling allowance than he does of his duties.

These Veterinary Assistants require to be more strictly watched by Township Officers under whom they are placed. Township Officers should, I think, be held responsible that these young men move about among the people, and that they bring themselves to the notice of cattle-owners. They should not be permitted to sit in their houses while cattle are dying in hundreds all round them, and the Township Officers ought to endeavour to induce the people to adopt such measures as these young men recommend in connection with the treatment and the prevention of disease.

I am fully alive to the difficulties under which these Veterinary Assistants labour, and I can well understand how discouraging it must be to them to find their efforts to induce the people to adopt rational measures for the protection of their cattle unavailing. Indeed, I am firmly convinced, and so must every one be who cares to study the question, that little good can be done by these cattle doctors until some legislative measures are introduced to deal with this question of cattle-disease, a question which is so intimately connected with the prosperity of the province.

JARUL TIMBER.

(*Indian Forester.*)

THE June number of the *Indian Forester* contains a report on experiments made on the Northern Bengal State Railway with sleepers made from certain Assam timbers,—among them Jarul, *Lagerstræmia Flos Reginæ*, from which it appears that, after 5 years using in an unballasted siding where of course white-ants and damp would get fair play, out of 100 Jarul sleepers, 46 were found to be in good and 11 in fair condition. And in the first article in the same number of the *Indian Forester*, it is noted that attempts are being made to grow Jarul in Assam. Having had some experience at Akyab of the timber called *Jarul* by the Bengalees there, and *Pyemma* (not, I think, *Pyuma* as Gamble has it) by the Burmese, I am puzzled how to reconcile that with the account given by Gamble of its qualities, and with what is now reported of the experimental *Jarul* sleepers.

When I took over charge of the Arakan (P. W. D.) Division in 1867, a large jetty was being finished, of which the piles were all either ironwood, *Xylia dolabriformis, Pynkado* Burmese, or so-called *Jarul*. The piles were whole trees, unsquared, and the largest were over 50 feet in length and up to nearly 3 feet in diameter at the butt. The Jarul piles were all brought from up the Koladyne River, and they were I think of two kinds, known as red and white *Jarul*.

The white Jarul was, I believe, the same wood that was used extensively in Akyab for beams and planks in house-building, as being much cheaper than ironwood or teak, but it was notoriously a favorite food of white-ants. It had a grain like ash, and was of about the same color. Gamble says that Jarul (*L. Reginæ*) is the most valuable timber of Sylhet, Cachar and Chittagong, and in Burmah the most valuable after teak, but he describes the wood as being light red. Not having had anything to do with the procuring of the piles for the jetty, I cannot say positively that either the white or the red wood, called *Jarul* at Akyab, was the produce of *Lagerstræmia Flos Reginæ*, but I think there were specimens of that tree at Akyab, and that I was told it was *Jarul*. And I have seen the *Lagerstræmia* in Pegu, and heard it called *Jarul* and *Pyemma*. At this distance of time, having left Burmah in 1870, I cannot recollect having seen the red *Jarul* in general use, except for the paddles of canoes, for which it was admirably adapted. The color and grain were like a darkish mahogany.

While at Akyab I had to substitute ironwood for white *Jarul* beams in the roof and floor of the Treasury. The earth oil with which the beams had originally been smeared had lost its virtue, and the white-ants had got in. After an interval of leave and other duty I again received charge of the Arakan Division towards the end of 1869, and was surprised to find the T-head of the jetty already extensively in need of repair. The *Jarul* piles, braces and walings were rotting, and the pile heads were being eaten up by white-ants, though they stood fully 500 feet from the shore at high water! The decay extended to low-water mark, but below that the Jarul timber seemed to be quite sound. The destruction by white-ants stopped at high-water mark. It had before become known during the construction of the jetty that whereas the *Teredo navalis* freely fed on, or bored through ironwood, it rejected *Jarul* as being unpalatable or unwholesome; and then, if I recollect rightly, the natives said they knew [illegible] *Jarul* did not stand exposure to the weather, or being alternately wet and dry, as were the piles and timbers down to low water mark. The timber of the jetty of both sorts had been carefully sheathed with tarred felt and Muntz metal, as protection from the *Teredo*, but in the case of the *Jarul* this proved the means by which the white-ants were enabled to effect the destruction of the pile-heads. At that distance from the shore it was of course a puzzle—first, whence came the white-ants; and second, whence they got the earth with which they make the galleries without which they cannot, or do not like to work. There is no doubt that the white-ants came from Calcutta or Chittagong, and were landed from the mail steamers, for the use of which chiefly the jetty was built. The cargo was stored in a closed shed by the T-head of the jetty until sent for by the consignees. Even ships themselves are sometimes damaged by white-ants. In 1865, I think, the Lighthouse Schooner *Alguada* was found to be nearly eaten up by them, but where the earthy medium came from in that case, I did not hear. Perhaps those interesting little creatures were then made innocent scapegoats, as in the celebrated case in which rupees were said to have been eaten by them. But in the case of the *Jarul* piles there was no mistake, and I got literally to the bottom of it. When making a survey of the damage done, I stripped off the felt and metal sheathing, and found that the ants had worked their way down inside or through the felt to considerably below high-water mark. This of course they did while the tide was low, and there they found the earth they were in quest of, in the shape of silt, deposited from the muddy water of the Koladyne estuary! I saw them going down and up, and they were not there eating the timber. The galleries the ants had made through and through the pile heads above high-water mark were as usual lined or filled with earth. I estimated for cutting off all the *Jarul* piles down to low-water mark, and putting ironwood heads (ironwood, or *pynkado*, [illegible] white-ants and weather) on them, but the Arakan Division [illegible]ed, and I was transferred to Bengal before this was sanctioned, and do not know what ultimately was done. I believe, however, that the timber jetty continued to go to grief, and that it has been replaced or superseded by an iron one. I cannot recollect whether I found any *red Jarul* on the pier-head thus rotten or ant-eaten, but I am under the belief that both red and white timber was used *in the work.*

What then was this white *Jarul*, that withstood the *Teredo* but was so easy a victim to the termite, and that was durable (for some years at least) under salt water, but unable to resist the weather? Was it a *Lagerstræmia* at all? Gamble does not say whether the *Lagerstræmia Reginæ*, which has a red wood, resists white-ants. I hope that some fellow-subscriber, if not the Editor, will be able to clear up this point for me, and to give some further particulars as to the merits and demerits of the red and white *Haruls*.

C. W. HOPE.

Mussoorie, June 18, 1885.

ON THE NECESSITY OF IMPROVED TILLAGE IN BENGAL.

ANY one who has paid the slightest attention to the history of Bengal during the last century, cannot but have been struck with the extremely rapid succession of famines during the last twenty years. The following table, taken from the Famine Commission Report, 1878, shows that while from 1769 to 1865, a period of nearly 100 years, the number of famines was only two, that from 1865 to 1885, a period of only twenty years, there were no less than four:—

A TABLE OF FAMINES IN BENGAL.

	Scarcity.	Duration.	Interval.
1769 70	***	1	...
1783-84	*	1	13
1865 66	***	2	81
1873-74	**	1	6
1877-78	***	...	4
1884 85	...	...	8

N. B.—One asterisk = Severe scarcity.
Two asterisks = A famine.
Three asterisks = An intense famine.

The asterisks against the year 1877-78 and the addition to the table of 1884-85 are ours.

The natural inference, therefore, is that during the latter period of time, there has come some change in Bengal either over its method of cultivation, its trade or its climate, which renders a famine, or, at all events, a scarcity almost inevitable during a period of 8—9 years. The activity which the Government of Bengal has lately been showing in agricultural matters is by some interpreted as the result of strong recommendations of the Famine Commission for agricultural improvements in this country, based, chiefly, they seemed to think, on the ground that it is to agricultural improvements alone that we should look for help against the periodical [illegible]its of famine. The establishment of an Agricultural D[illegible]ent and the employment under it of specially trained offic[illegible]th the object of introducing scientific reforms are viewed by m[illegible] people with a sort of nervous fear lest the agriculture of this country should be allowed to deteriorate too much to admit of any profitable improvement at a moderate cost; by others again, with genuine fear, but on a different ground, namely, lest the Government, by introducing unknown and unheard of reforms, should ruin the agricultural prosperity of this country. We need scarcely say that we share none of those feelings. We rejoice to think that the Government has at last thought fit to act upon the recommendations of the Famine Commission. We further rejoice that, almost simultaneously with the department, a very well-managed monthly journal devoted to agricultural subjects chiefly, has been started with the laudable object of interesting the educated public in agricultural matters, and we earnestly hope that both the department and the journal may prove a success. As yet, however, we do not think that the public at large are prepared to appreciate and profit by an exposition of the truths of scientific agriculture which have lain up to this date a sealed letter to us. A few words then on agricultural matters in these columns will not, we hope, be without some service to the public.

Notwithstanding the frequency of the famine, the periodical visits of cholera, malarial fever, and other diseases, the check given to early marriage by the gradual spread of education, and lastly, the gradual increase in emigration, the total population of Bengal is on the whole increasing. From the Census Report of 1881 we find that the total increase, all over Bengal, including the Feudatory States during the ten years from 1871 to 1881, was 6,831,143, *i. e.*, about 10·89 per cent. Considering that the year 1876-77 was one of severe mortality owing to famine, we have no reason to suppose that the population has not since increased at more than a proportionate rate. Of this total increase, a considerably greater advance is seen on the urban than on the rural population. Setting aside the insignificant ratio of the boat population, [illegible]ntage of the urban on the rural population was in[illegible]96, while in 1881 it was 5·26, thus showing [illegible]e of urban population of about ·30 per cent. Assuming the agricultural population to be, as the Famine Commission Report tells us, about 90 per cent of the total rural population, and that this ratio holds good even at the present day (which however is not the case—as the percentage of the urban population is every day increasing) this number, though insignificant in itself, implies that nearly 18,000 people who were presumably born to the agricultural profession had to give it up for some reason or other. It requires little argument to show that a more than proportionate number of the rural population have done similarly since 1881. For, as we take it, the laws that brought about this diminution of the rural population have operated during the last few years, and will continue to operate ever afterwards with much greater intensity than they had hitherto done. It is inevitable, as civilization progresses in this country, that this diminution should continually be on the increase. Civilization has for its object the division of labor and the directing of it into different channels, and to this end establishes forms of industry other than agricultural industry. The gradual development of the innumerables and ever-increasing branches of arts and commerce, which absorb a greater and greater portion of the labour which was formerly employed chiefly on agricultural operations, is a necessary condition for the progress of civilization. Taking two of the most civilised countries of the world, we find that the urban population is in neither case lower than 30 per cent:—

India	... 4·96	Percentage of urban on total population in 1871.
France	... 31·06	
England	... 64·8	

If, therefore, we are to progress at all, at least on the same lines that we have been doing since the last hundred years, this diminution in the rural population (which to us is almost synonymous with agricultural population) must be continually increasing. It is true this process of replacing agricultural labor may be carried too far. Look, for instance, at the case of England, where, in 1881, the percentage of urban on the total population was about 66·6 per cent. It is well known that the remainder, *i. e.*, 33·4 per cent. was not wholly rural, much less agricultural. It is due to these circumstances mainly that agricultural labor is so highly paid out there—being much as 3 to 4 shillings per day per laborer. The problem which a highly civilized nation like the British has to deal with, is how to so regulate the different branches of labor as to bring to the country the greatest amount of wealth without seriously diminishing the amount of agricultural labor available. But as yet we Indians are as far from that state as are the heavens from the earth. What is important to us is the recognition of the fact that, with the progress of civilization, the relative proportion of our agricultural population must diminish, and that, as with us, there is no difference whatever between the agricultural laborer and the farmer, this diminution implies the withdrawal of so many men from the agricultural profession.

Now this disproportionate diminution of our agricultural population would mean a corresponding decrease in the extent of our cultivated land unless we supposed—*fir*[illegible] [illegible]cien-cy was observable amongst our peasan[illegible] m[illegible]d of cultivation, or *secondly*, that man [illegible] 20 [illegible]ed by [illegible] machinery to the necessary extent. T[illegible] supposition, if correct, would, of course, show that [illegible]ing off in the number of agricultural holdings, due [illegible] parts [illegible]ution of persons holding them, or the removal of [illegible]ands from any particular holding was neutralized by an[illegible]y well [illegible] of smaller into larger holdings, or by a better managem[illegible]em. As to efficiency of management it assumes, of c[illegible] prior inefficiency. Any one, however, who has had to deal [illegible] our peasant, knows but too well that idleness has never bee[illegible] his line, and that he has always had as much work to do as [illegible] th[illegible] possible for him to do in consistency with his strength. Gre[illegible] efficiency with him, therefore, implies greater strength, better machinery, or better cattle, the latter two items implying the possession of a larger capital than before. In the face of his extremely notorious poverty and absence of any evidence whatever of an increase in his physical strength, we must dismiss the first supposition as extremely unlikely. Besides that he has never introduced any improved machinery or any better cattle is a fact of history. Under these circumstances, the possession by him of surplus hands, *i. e.*, of labour which he could spare, seems to us to be a groundless assumption. The question, therefore, of his improved efficiency falls to the ground. As to the second supposition, it has already been shown that the Bengal farmer never introduced any machinery by which any perceptible replacement of labor could take place, so far as the tillages of the soil are concerned. Nor do we know of any such improvement ever having taken place in any other way.

It thus appears that diminution of our agricultural population has been followed by a decrease of the acreage under cultivation. We need only refer to the experience of living men to prove that the reclamation of waste land for purposes of cultivation and the formation of *churs* in river-beds, together form but a small fraction of the quantity of arable land that has gone out of cultivation in Bengal—either being allowed to run to waste, or, having houses, manufactories, or other buildings, more or less expressive of social progress, built upon it.—*Indian Mirror*, August 22.

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

The disease commences with a slight derangement of the stomach, but if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions, he will be able to determine whether he himself is one of the afflicted:—Have I distress, pain, or difficulty in breathing afters eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste? Is the tongue coated? Are there pain in the sides and back? Is there a fullness about the right side as if the liver were enlarging? Is there costiveness? Is there vertigo or dizziness when rising suddenly from a horizontal position? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach of? Is there frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty, brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantty of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market-Place, Pocklington, York, Oct. 2, 1882.

S —Being a sufferer for years with dyspepsia in all its worst for , and after spending pounds in medicines, I was at last persu ied to try Mother Seigel's Curative Syrup, and am thankful to sa have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same mplaint to give it a trial; the results they would soon find our r themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. Turner.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

St. Mary-street, Peterborough, Nov. 29, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,

Mr. A. J. White. William Brent.

Hensingham, Whitehaven, Oct. 16, 1882.

Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) John H. Lightfoot.

August 15th, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.—Yours truly,

(Signed) N. Webb,
Chemist, Calne.

Mr. White.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer describes it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Signed) Vincent A. Wills,
Chemist-Dentist,
Merthyr Tydvil.

To Mr. A. J. White.

Preston, Sept. 21st, 1883.

My Dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said, "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully; in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.—I am, dear Sir, yours faithfully,

(Signed) [illegible]WKER.

To A. J. White, Esq. (A)

GOLD MEDAL, PARIS, 1878.

JOSEPH GILLOTT'S

STEEL PENS.

BY ALL DEALERS THROUGHOUT THE WORLD.

Holloway's Pills.—Enfeebled Existence.—This medicine embraces every attribute required in a general and domestic remedy; it overturns the foundations of disease laid by defective food and impure air. In obstructions or congestions of the liver, lungs, bowels, or any other organs, these Pills are especially serviceable and eminently successful. They should be kept in readiness in every family, as they are a medicine without a fault for young persons and those of feeble constitutions. They never cause pain, or irritate the most sensitive nerves, or most tender bowels. Holloway's Pills are the best known purifiers of the blood, and the best promoters of absorption and secretion, and remove all poisonous and obnoxious particles from both solids and fluids.

FOR PRICKLY HEAT, CONSTIPATION, HEADACHE, BILIOUSNESS, CHOLERA, FEVERS, &C.

The testimony of Medical gentlemen has been unqualified in praise of

LAMPLOUGH'S PYRETIC SALINE,

As possessing elements most essential for the restoration and maintenance of health with perfect vigour of body and mind.

It is Effervescing & Tasteless: forming a most Invigorating, Vitalising & Refreshing Beverage.

Gives instant relief in HEADACHE, SEA or BILIOUS SICKNESS, CONSTIPATION, INDIGESTION, LASSITUDE, HEARTBURN, and FEVERISH COLDS; prevents and quickly cures the worst forms of TYPHUS, SCARLET, JUNGLE, and other FEVERS, SMALLPOX, MEASLES, and ERUPTIVE or SKIN COMPLAINTS, and various other altered conditions of the Blood. A valuable PREVENTIVE of DYSENTERY.

Dr. PROUT.—"Unfolding germs of immense benefit to mankind."
Dr. MORGAN.—"It furnishes the blood with its lost saline constituents."

Dr SPARKS (Government Medical Inspector of Emigrants from the Port of London) writes:—"I have great pleasure in bearing my cordial testimony to its efficacy."

GOVERNMENT OFFICIALS AND PLANTERS caring for the welfare of their employes should note its value as a specific in Fever Cases.

Dr. J. W. DOWSING [illegible] the treatment of forty two cases of Yellow Fever and am happy to state I [illegible] e code."
Dr. W. STEVENS [illegible] the Fatal West India Fevers are deprived [illegible] terror."
MAJESTY'S REPRESENTATIVE the GOVERNOR of SIERRA LEONE, [illegible] sent for an additional supply of the Pyretic Saline, states—"It is of great value, and I shall rejoice to hear it is in the hands of all Europeans visiting the Tropics."

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THE

INDIAN AGRICULTURIST.

A WEEKLY

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VOL. X.] CALCUTTA :—SATURDAY, SEPTEMBER 5, 1885. [No. 36.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 26TH AUGUST 1885.]

General Remarks.—Except in Malabar and Travancore, the rainfall during the past week in the Madras Presidency has been very slight. In Bellary heavy rain is urgently wanted for the dry crops, which are generally withering and are in a critical condition. More rain is also wanted in Ganjam, Kistna, Coimbatore, Tanjore and Madura. In Mysore little or no rain has fallen since the date of the last report. The young dry crops are reported to be withering, and agricultural operations have been retarded. Prospects are unsatisfactory in Tumkoor, Kolar, Kadur, Shimoga, and Mysore.

Good rain has fallen in most districts of the Bombay Presidency, but in Nasik, Poona, Ahmednuggur, Sholapore, and Dharwar more is needed. In Sholapore especially the situation is unsatisfactory; very little *kharif* is sown, and the season is now over. Fodder is scarce in several districts. In the Berars and in the Nizam's territories the season is favourable, and crop prospects are good. Rain has fallen throughout the Central India and Rajpootana States, and agricultural prospects are on the whole very satisfactory.

In the Central Provinces the weather continues favourable for the crops, which are progressing satisfactorily. [illegible] much needed in Saugor and Hoshungabad. [illegible] in two districts, rain has been general in the [illegible] *kharif* prospects are favorable. Heavy rain has [illegible] many districts in the North-Western Provinces and Oudh, [illegible] injury to crops on low lands. Agricultural prospects are fair.

Rain has been general throughout Bengal, but excessive in Moorshedabad, Burdwan, Hazaribagh, and Midnapore. Considerable injury has been done to both *aus* and *aman* crops in Burdwan, and to the *bhadoi* crops in Moorshedabad and in parts of Behar. Elsewhere agricultural prospects are favourable, and the *aus* harvest is yielding a fair outturn. The weather is seasonable in Assam, but in Sylhet more rain is wanted. Transplanting of *sali* crops continues.

Heavy rain is reported from British Burmah, where ploughing and transplanting continue.

Cholera is chiefly prevalent in the Madras and Bombay Presidencies, and in Raipore in the Central Provinces. Elsewhere the public health is generally fair.

Prices are generally steady, except in the Punjab, where they are fluctuating.

Madras.—General prospects fair, improved in Bellary and Anantapore; crops are in very critical condition and in some villages already past revival; in Madura and Coimbatore reported to be discouraging.

Bombay.—Good rain in most districts, more wanted in parts of the Deccan and Southern Mahratta Country, especially in Sholapore. Crops withering for want of rain in two talukas of Sholapore and injured by excessive rain in parts of Gujarat and by insects in parts of Kurrachi and Upper Sind Frontier; fodder scarce in parts of Khandesh, Sholapore, Ahmednugger, Nasik, Bijapore, and Belgaum. Cholera general; fever and cattle-disease in parts of eight, and small-pox in parts of three districts.

Bengal.—Rain has been general throughout the province, but excessive in some parts. In places in the Burdwan division floods are doing considerable injury to both *aus* and *aman* crops; much damage has also been caused by floods to *bhadoi* crops in Moorshedabad, and on low Dearah lands, and in parts of Behar; elsewhere agricultural prospects are favourable; *aus* harvest is promising and is yielding a fair outturn; transplanting is still progressing in Behar. Price of rice continues high. Public health generally fair.

N.-W. Provinces and Oudh.—Rainfall general, except in Dera Ismail Khan and Peshawur districts. Fever in the Peshawur district, elsewhere the health is good. *Kharif* prospects favourable. Prices of food grains rising in the Sialkot and Shahpore districts, falling in Hissar and Ferozepore, and generally stationary elsewhere.

Central Provinces.—Except in Saugor, where a break is much needed, the weather has been very favourable for the crops; showers alternating with bright sunshine. Cholera continues severe in Raipore.

British Burmah.—Cholera prevalent in one district, slight in three districts, elsewhere health good; cattle disease severe in two districts, slight in five districts, elsewhere health of cattle good. Ploughing and transplanting progressing. The rain has been exceedingly heavy in all districts, except Prome, and slight damage to crops from floods is reported in two districts.

Assam.—Weather seasonable. Transplantation of *sali dhan* continues; prospects of tea good. Fever and bowel-complaints prevalent, otherwise public health good.

Mysore and Coorg.—Young dry crops reported to be withering; agricultural operations retarded and uneasiness prevalent; in Tumkoor prospects reported as critical in Kolar as uncertain, in Kadur lowlands as unfavourable, in parts of Shemoga lowlands rice crops need heavy rain; water and fodder becoming scanty. Coffee and cardamom crops in good condition. Prices of food-grains slightly fallen. Prospects of season and public health good.

Berar and Hyderabad.—*Rabi* sowings concluded: weeding of *kharif* crops commenced. General health good. Prices—wheat 14¼, coarse rice 12¾, white *juari* 19½, yellow *juari* 22¼, and *tur* 15¼ seers per current sicca rupee.

Central India States.—Prices falling. Crops thriving. Weather clear. Health good.

Rajpootana.—Weather cloudy and rainy. Crop prospects good. Slight cholera and fever prevalent in parts; otherwise health good.

Nepal.—Weather cool. Prospects good. Cholera disappearing.

Editorial Notes.

THE question of the possibility of Artesian wells existing in Vizianagram having been re-opened, DR. WM. KING, of the Geological Survey of India, has been deputed to report on the subject for the Madras Government, and he leaves Calcutta for Bimlipatam on the 5th instant (this day).

⁂

THE prices realised at the Opium Sale on the 2nd instant are considerably above the budget estimates. The prices were as follow :—

		Average.
Behar ...	... Rs. 1,285 to Rs. 1,295 ...	Rs. 1,287
Benares ...	... Rs. 1,255 to Rs. 1,270 ...	Rs. 1,262

The general average upon the 4,166 chests sold was Rs. 1,274.

⁂

IN another column will be found the orders issued by the Government of India, in respect to the rules to be observed generally during the prevalence of scarcity. Paragraph 3 of the Government of India letter is important, inasmuch as it recognises the Government responsibility for the measures taken to meet famine or scarcity.

⁂

THE supplement to the last *British Burmah Gazette* contains a valuable paper by Mr. J. E. Bridges, Director of Agriculture, British Burmah, on sugarcane and sugar trade in that province, and brings to light some facts not previously known on this subject. We have read the paper with much interest, and reproduce it *in extenso* elsewhere for the benefit of our readers.

⁂

IN the same issue of the *British Burmah Gazette* is a report on minerals in Tenasserim by Mr. R. Romanis, the chemical examiner, which we also reproduce, as the mining industries in Burmah are attracting much attention just now. A company has already been formed to work the lead mines of the province, and others may soon be following suit to work other mines.

THE quantity of cotton exported from British Burmah during the month of July 1885 was 7,035 cwts., amounting in value to Rs. 1,57,406. The export was confined to the port of Rangoon and the destination was chiefly to foreign ports out of India. These figures show that the cotton trade of the province is no insignificant factor.

***

SOME time back we noticed an American invention which claims the merit of refining sugar by electricity. We did not quite believe in the *bona fides* of this novel process, but gave the information for what it was worth. We now see from an article in the last number of the *Sugar Cane* to hand, together with the connected papers on which the article is founded, that the invention may be regarded as a *fait accompli*. This will certainly create a revolution in sugar-refining; and if the whole thing is not a gigantic fraud, this is another triumph for the inventive genius of our trans-atlantic cousins. The article from *Sugar Cane* will be found among our selections.

***

WE regret to say that a mistake unfortunately crept into our columns in the issue of June 20th last, with respect to the grant of a C. I. E. to Mr. C. K. Mudilair of Madras. On looking over the list of birthday honours distributed last June, we find that it is Mr. P. S. Ramaswamy Mudilair, Avargal, of Madras, upon whom the honour has been confirmed, and *not* Mr. C. Krishnaswamy Mudilair, the recipient of the gold medal from the Government of Madras for agricultural improvements. The error should have been rectified before had we known it. Only within the last few days it has been pointed out to us, and we hasten to make the correction.

***

THE total imports entered at the several ports of British Burmah, during the month of July 1885, amounted in value to Rs. 48,26,554, divided as follows :—

Foreign ports out of India	... ..	25,56,343
British ,, in other provinces	... ..	18,63,921
,, ,, within the ,,	... ...	3,05,817
Indian ,, not British	... ...	40,473

There were no importations of gold, but of silver there were :—

For Government	... ...	60,000
,, private parties	... ...	20,6 0

The exports during the same period amounted to Rs. 77,01,049 in value, and were as follows :—

		Rs,
Foreign ports out of India	... ...	51,88,866
British ,, in other provinces	... ...	13,75,974
,, ,, within the ,,	... ..	3,63,399
Indian ,, not British	... ...	1,72,810

There was no gold exported, and the silver, which amounted to Rs. 1,15,413, was entirely confined to private parties. It will thus be seen that the exports of articles exceeded the imports by Rs. 28,74,495, and the silver exports over imports amounted to Rs. 44,813.

***

WE understand that his Honor the Lieutenant-Governor of the N.-W. Provinces and Oudh has sanctioned a proposal to have an Exhibition of Arts and Manufactures in Lucknow during the last week of November. It is intended to collect the best specimens of the principal art manufactures of the united provinces, and the local Government has not only been liberal in making a grant for prizes, but has expressed its intention of purchasing the best articles for the Indo-Colonial Exhibition, London, 1886. These specimens will be the principal features of the Exhibition, but a section will be added for Oudh arts and industries of a humbler description. The addition of a Loan Exhibition of articles of Oriental Art complete the scheme. The Municipal board has placed Rs. 5,000 at the disposal of the Exhibition Committee, and we believe the British Indian Association will not be backward in contributing to so useful an undertaking.

***

A MEETING, consisting of the leading ryots of Atur and surrounding villages, together with the taluq officials, was held recently at the public chuttrum, for the purpose of establishing an agricultural farm, where agricultural pursuits may be tried on new and improved methods. The Tehsildar, Mr. Ram Seshya Iyer, B.A., was voted to the chair. He explained the advantages to be derived by the introduction of European ploughs, irrigating machines, &c. He also earnestly desired his hearers to give the innovation (for they deemed it nothing else) a fair and efficient trial, and judge the results by the material advantages accruing therefrom. The address had the desired effect, for many ryots expressed their willingness to join, and were enrolled as members. Great credit is due to Mr. Ram Seshya for his endeavours to establish this association, as Atur is a taluq in the Salem district where agriculture is the *main* pursuit of its inhabitants, so it presents a fair field for the development of the new method.

***

ABOUT three weeks back we noticed Mr. Cabaniss' note on cigar-making in Burmah, and thought it a very practical paper. We now read the following paragraph in the *Rangoon Gazette*, from which it would appear that much success has attended the growing and curing of tobacco on the Government farm at Kyouktan :—"We are indebted to Mr. Cabaniss, Assistant Director of Agriculture, for a sample tin of cut tobacco grown at the Government farm at Kyouktan from Havannah seed, which has a fine delicate aroma and smokes very mild. It shows what can be done in Burmah for the development of the tobacco industry by adopting proper systems of cultivation and curing. It will take many years, however, to get Burmans to adopt European ideas and methods which, though yielding a better return and a finer article, are yet too troublesome to the Burman mind. But Government should direct its efforts to inducing Chinamen, who are more patient and painstaking, to go in for tobacco cultivation."

***

THE Director of Agriculture in Madras has received the sanction of the local Government to the publication of forecasts of the harvest prospects of certain food-grains and special crops. We suppose these forecasts will be somewhat on the lines of those published in respect to wheat by the Director of Agriculture and Commerce, N.-W. Provinces and Oudh. To sum up briefly, it is intended that each year four forecasts should be issued detailing the area sown, as compared with the average area of the previous five years' sowings, and also four condition and outturn reports dealing with the state and expected outturn of the crops, valued in annas. The first reports are to be issued as soon as possible after the first day of September, December, March, and April, respectively. These reports would deal with the sowings of the early crops, such as paddy, cholum, cumbu, ragi, and indigo; the second and the third with the sowings of the later crops of paddy, cholum, ragi, cotton, and late indigo, and the last with sugarcane. The condition and outturn reports are to be issued after the 1st of October, January, April, and May, dealing principally with the crops mentioned in the area report of the previous month; but the June report would also contain the final summary on the harvest of the year for all crops.

***

THE methods by which the Director proposes to calculate the standard of the different crops are, in our opinion, somewhat round-about. We would recommend the Southern Presidency to take the wheat forecasts of the N.-W. Provinces as models to work upon. A review of the last and final forecast will be found in the *Indian Agriculturist* of June 27th, 1885, page 306. We may observe that these forecasts are thoroughly practical, and what is of much more importance, reliable. The Government of the N.-W. Provinces and Oudh is remarkable for the accuracy of its agricultural statistics, and the advanced stage of its agricultural operations. But anything that the Madras Government may undertake in this connection will be a happy change, and an improvement upon the season reports and telegrams issued at present. The chief point, however, to be borne in mind is punctuality, and unless issued at the earliest possible dates, the forecasts will lose half their value.

THE outlook of the wheat crop in America has been one of anxiety, but from the last report (July) of the Department of Agriculture, we see that the month has been favourable to the development of winter wheat, and a slight improvement is indicated which advances the general average two or three points, *i.e.*, from 62 to nearly 65. The corn crop, however, which is the great crop of the country, shows an increase of 6 per cent. Very few States show any decrease. In many cases the failure of wheat has been made up by the planting of corn for the winter supply; wheat-lands have therefore been largely utilized. In fact, the condition of corn is reported as being higher than in any year since 1880, except the last. The condition of oats continues high and promises a large crop. The average is 97, an increase of three points since the last reports. Potatoes show the same condition and average; while the area under sorghum has declined in nearly all the states where it is grown, the low price of sugar and syrup are said to have had a discouraging effect. Cotton has shown an improvement since June, and the average condition has advanced from 92 to 96. The condition of grasses and pastures is reported as favourable. The fruit crops encourage a hope of a favourable season. On the whole, prospects now look hopeful.

⁂

THE following remark by Mr. R. Romanis, Chemical Examiner, British Burmah, on the state of agriculture in Tenasserim, is worth reading. It is *multum in parvo*, and contains a whole mine of important information:—"The most remarkable feature of the province is the large proportion of land under garden cultivation. The orange gardens of Kyaing on the Gyaing are noted for their fertilit[illegible] miles the Salween and Gyaing are li[illegible] plantain, areca, palm, and cocoanut. Th[illegible] and durians exported to Rangoon and elsewh[illegible] grown principally along the road between Moulmein and Amherst. The small export of rice from Moulmein, in proportion to the area under cultivation, is explained partly by this great proportion of garden ground. It is said that a good deal of rice goes in cargo boats and small country craft along the coast, of which no note is taken. The large population engaged in the timber trade above the frontier must absorb a certain proportion. I noticed a large quantity of tobacco growing along the banks of the Doudami river. The soil here probably resembles that in which the Kyaukkyi tobacco is grown. On the whole I think the Tenasserim province a more favourable field for agricultural experiments than Pegu. The Shans and Taungthus are accustomed to grow a variety of crops, and are more likely to adopt new things than the Burmans of Pegu."

The concluding paragraph we regard as most important, and hope soon to hear that the Chief Commissioner has taken steps to initiate agricultural experiments in this *Eldorado*, somewhat on the principle of those carried on in Mergui and the Arakan Hill tracts, which were noticed by us very recently.

⁂

A SHORT time back we noticed the energetic enterprise of the proprietors of the Murree Brewery Company in opening a Brewery in Ceylon. We now learn from the *Times of Ceylon* that the alterations and extensions which have been going on upon the brewery buildings and premises for some months past are now nearly completed, and the manager confidently expects to begin operation within a month from the present time. All the works are being fitted up with the latest improvements known to the trade, similar in fact to those large establishments in various parts of India which have been of late years worked so successfully by the Murree Brewery Company, of which this is a branch. This Company has given the Indian military authorities so much satisfaction that it has now the practical monopoly of the beer supply for the troops throughout the presidencies. The Company hope to obtain the contract for the supply of the troops in British Burmah, for which application has been made; and it is their intention, if successful—as there is very little doubt they will be—to supply that place from their brewery at Nuwara Eliya. About 3,000 hhds. would be required annually, so that the railway would directly benefit by the traffic of the raw material up and the manufactured article down. When Mr. Whymper was in Ceylon recently we believe he interviewed Mr. Pearce, with a view to obtaining some concession in the way of transport, but without success, that rigid red-tapist as usual not seeing his way to make any relaxation in existing rates. We hope, however, that the "careful consideration" into which Mr. Pearce recently stated he had taken the question of these self-same exorbitant rates will have the effect of producing an extensive lowering thereof. Such an enterprise as a local brewery at Nuwara Eliya, should be encouraged as much as possible, and we have no doubt that a proper representation on the subject will have due effect. Mr. Howard, the local manager of the brewery, has not all the machinery and appliances up in Nuwara Eliya, but most are in position, and we hope to hear that the first brew shortly to be undertaken is a successful one, for no pains or expense have been spared by the Company to provide for all contingencies.

⁂

FOREST Conservancy in the Bombay Presidency has formed the subject of much discussion latterly, and the appointment of a Forest Commission to enquire into the grievances of the people has been the result. From a telegram received in Calcutta we learn that Lord Reay opened the Forest Commission on the 27th ultimo at Poona with a very remarkable address, in the course of which he laid down the lines upon which the Commission would have to work. The members of the Civil Service, on Commission, he said, were not acting as Government representatives, but had been appointed to give their own views and the result of their own experience. He would not enter into the causes which had led to the appointment of the Commission, but it was a remarkable fact that both the late and the present Secretary of State had approved of the institution of such an enquiry, and that the sanction of the Viceroy had also been obtained for it. Since he had been charged with his present duties, the matter had been a constant source of anxiety to him. Agricultural problems had always struck him as peculiarly interesting, and the more one looked into the agricultural systems of various countries, the more one became convinced that over-legislation in agricultural matters was a mistake. Agricultural centralization would certainly lead to disastrous consequences. Local wants, customs, and systems, and village tenures had best not be wantonly disturbed, unless very good cause was shown. He approached agricultural questions with a strong bias in favour of the agriculturist, as every Scotchman would have been accustomed in Scotland to give the most respectful consideration to the experience of shrewd farmers, shepherds, and farm servants. He believed that if the forest conservancy tended to increase the supply of fodder and fuel for the people of the country, the enterprise would meet with support and have their sympathy. He also believed that hardships could be mitigated. His chief object was to substitute co-operation for antagonism, confidence for distrust, contentment for disturbance. The Commission, he had no doubt, would assist the Government in its endeavours to remove legitimate grievances. They would assist the Government in preventing the wanton destruction of timber,—a proceeding utterly unwarrantable, and most demoralising and injurious to national interests. A strong Government did not stand in need of exceptional measures to put a stop to such vandalism. The Commission would strengthen, not weaken, the ultimate action of the Government.

⁂

MR. CABANISS, Assistant Director of Agriculture, British Burmah, has been trying his hand at plough-improving in Burmah with much success, according to the *Rangoon Gazette*, which says:—We have seen a model of an improved Burman *Tone-than* or plough (used for ploughing paddy fields) devised by Mr. Cabaniss, who, in watching the working of one of these primitive implements, observed that a very great deal of time was lost by the ploughmen having every now and then to stop and clear the prongs of his plough from the long grass which clogged or entangled the prongs of his plough. Mr. Cabaniss' *Tone-dhon* has a reversible row of prongs, set in a roller made of wood. When one set gets clogged, by raising the handle of the plough the roller goes round, and the spare row of prongs takes the place of the other, which gets cleaned during the change; the handle of the plough is lowered and the ploughing continued without more than 3 seconds' loss of time. Mr. Cabaniss' invention, or rather improvement, is as ingenious as it is simple; and the Burmese who tried two or three of the ploughs constructed on the improved plan are quite charmed with them, as they not only saved much time and trouble, but they are able to adjust the prongs to any angle by means of the plough-handle as the plough journeys along.

⁂

"IN *Cassell's Popular Gardening*, we came across the following practical instructions for raising orchids by seed:—The seeds of orchids are sown in pots filled with crocks and growing sphagnum, or better still, upon the sphagnum growing about other orchids. It is necessary that the seeds should be sown immediately on their becoming ripe as, owing to their smallness and extreme delicacy, they do not retain vitality long. They should be scattered upon the sphagnum and then left to themselves, the treatment required by the plant about which they are sown being such as will afford them all they need. To prevent the risk of washing the seeds away with water, the top and sphagnum upon which they are shown should be dipped a little way in water so as to allow it to soak upwards, and not watered over-head. The time seeds of orchids take to germinate varies, according to the species, from three to twelve months. Seeds of *Disa grandiflora* are perhaps the easiest managed among orchids; they may be sown upon a mixture of chopped sphagnum and peat. Numerous varieties of this beautiful orchid have been obtained from seeds raised in this country. Germination having taken place, and the seedlings being large enough to handle safely, they may be removed from the seed-pot and planted in tiny pots of chopped sphagnum and crock-dust. To guard against drought and danger to the seedlings, it will be found a good plan to *place a number of these tiny pots together in a flat pan, filling up between the pots with sphagnum; these pans may then be suspended near the glass in* a shaded house of the temperature suited to the requirements of each kind of orchid. Patience of no ordinary kind must be possessed by anyone attempting the raising of orchids from seeds, as it takes a very long time for most of the kinds to arrive at a flowering condition. In the case of catteleyas, for instance, it generally takes from seven to ten years, and sometimes even longer, to grow a plant from seed on to its first flowering.

⁂

CEYLON teas hold a high place in the English markets, and the following remarks by Mr. H. K. Rutherford on the yield of acreage under tea in that island, will be read with interest:—"This subject has not, as far as I am aware, been entered into by others, at least I cannot find any record of it in the tea literature of Ceylon. Many individual estates have been quoted as producing heavy crops, and proprietors and superintendents have vouched for the large yields which are being obtained per acre of certain estates. When however we compare the acreage under tea in the island, with the amount of our exports of the product, it does not up to date show that the average yield of our estates is likely to exceed that of India for many years to come. The last published returns of Indian Tea Companies, representing 42,355 acres, showed a return of 311 lbs. per acre, and it will be seen with reference to the following statement that we have only reached an average of 210 lbs. per acre, and will not exceed this before 1888. This of course we attribute to our trees not being matured, but look forward to, at any rate, as good a yield per acre as India in the future. In my opinion, it is doubtful if our average yield will exceed that of India to any appreciable extent. I think, we can, with a fair amount of correctness, foretell what the yield of our acreage will be up to 1888, but any calculations going beyond that date would not come within the pale of accuracy or practical usefulness. I have for the year 1888 estimated a yield of 20¾ million lbs., and I think it is reasonable to suppose that we shall obtain in that year an average of 210 lbs. per acre off 90,000 acres in bearing. Mr. W. Anderson in March last published a statement showing that there were 85,800 acres under tea in Ceylon at the end of 1884. I am of opinion this is somewhat in excess of the actual acreage at that date, and I prefer to take 72,000 acres as being nearer the correct amount.—No statistics are yet available for the acreage planted this year, but I think in taking the total at 102,000 acres to the end of 1885, I shall not have exceeded the actual amount planted. With regard to the local consumption there is no data available to enable us to say with certainty what quantity is consumed, but I find in 1881 there were 87,000 lbs. of China tea imported into the island, and when it is considered that the burgher and native population, who a few years ago drank coffee, now consume tea, I think it is reasonable to suppose that the local consumption will rise to 200,000 lbs. by 1888."

⁂

IT seems to have been fully proved that experiments with fibre in the Madras presidency have, in the majority of cases, resulted in failure. The report of Mr. Price, the Acting Director of Revenue Settlement and Agriculture, Madras, bears out this conviction. It appears that in 1883 a sum of Rs. 2,000 was provided for the "improvement of agriculture and trade," more than half of which was devoted to experiments with fibres. In five different districts attempts were made to extract fibre, and in each case they proved financial failures. The fibres experimented upon were *aloe, sunn hemp, sansievera zeylanica, agave vivipara, agave Americana, helicteres isora*, and *lasiosiphon eriocephalum*. It is needless to go into details, as in every single case the fibre was collected and prepared [illegible] loss as valued in the markets. We took occasion to observe a short time back that it was a waste of time, labour and money to attempt [illegible] at any satisfactory understanding of the value of these fibres, unless the experiments were conducted with *thoroughness*. In this opinion we are fully borne out by the testimony of Mr. Price himself, who concludes his report with the following very sensible remarks:—

> I take advantage of this opportunity to submit, for consideration, the futility of the amateur experiments with fibres which are, from time to time, carried out by Revenue officers in different parts of this presidency. The results, as far as my knowledge goes, have, invariably, been financial failures. It could hardly be otherwise when the fibre has to be prepared by hand and by unskilled workmen * * * We know most of the fibres: we know the value of a large number of them. What is now required is certainty as to the supply—naturally or by cultivation—of the raw material and means for the cheap, rapid, and efficient preparation of the fibres. As regards the former point, it is, in the case of certain fibres, *e.g.*, aloe, the *calotropis, fourcroya, sansievera*, &c., assured. The latter is that which still awaits a satisfactory solution. Until this is arrived at, it is, I submit, throwing away time, trouble and money to produce by hand indifferent samples of fibres which are, owing to the method of their preparation, costly, and which being indifferently got up, are priced at considerably below their proper value.
>
> There is, no doubt, a mine of wealth in the fibres of this presidency if properly worked. I venture to throw out the suggestion that the time has arrived when the subject might well be placed under a specialist, and be taken in hand as that of mineralogy has recently been. The most energetic and zealous of Collectors can really do very little. They are overburdened with other work, and have to leave details much with subordinates, and few, if any, have any but the most superficial knowledge of fibres and the proper methods of preparing them, even after the native fashion.

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THE head of the Agricultural Department, a gentleman of much varied experience, expresses himself as above; and it is therefore somewhat disappointing to find that the Government of Madras, with Mr. W. Wilson (the late Director of Agriculture) as Revenue Secretary, should take a different view of the question. This is what the Government says:—

> With reference to the concluding paragraph of Mr. Price's letter, the Government observe that the problem of cheap, rapid, and efficient preparation of fibres is not one which can be solved by the creation of a special Government agency apart from the Agricultural Department. It is a question for inventive genius

and engineering skill, and the prospective profits of a successful invention seem sufficiently bright to encourage private investigation in this direction. It is noted that the prize of Rs. 2,000 offered last year by the Government of Bengal was awarded at the Calcutta competition to Messrs. Death and Ellwood's Universal Fibre-cleaning Machine, the working of which was found to be "rapid and effectual." The Government concur in the opinion expressed by the Bengal Government that the further question, whether this or some other machine can be profitably introduced into this country, "may well be left to be decided by the commercial public."

To this we reply that, if the introduction into this country of a fibre-decorticating machine "may well be left to be decided by the commercial public," what need is there of experimenting with fibres, spending large sums of money on them, taking up the time of Collectors and other officers unnecessarily, sending specimens to England for valuation, &c., *all with ultimate loss?* To ascertain the market value of any particular fibre, it must be prepared so as to meet the requirements of the market, and at the lowest possible cost, otherwise the experiment is utterly worthless. It therefore follows that, to prepare any fibre with this end in view, there must be a specialist at the helm, and the best machinery available for the purpose. The trade require facts and figures, and a *technical* analysis of experiments; and if the Government mean to encourage trade and private enterprise, it can serve no useful purpose in attempting to do so by half-measures.

THE INDIAN COAL MINES.

MR. JOSEPH CHATER, [illegible], Superintendent, of Messrs. APCAR and Co.'s Collieries at Setarampore, has undertaken to answer the enquiry as to the need of legislation on the part of Government, in connection with the Indian Coal Mines. His reply which forms a neat little *brochure*,* printed by Messrs. NEWMAN & Co., in the well-known style of the CAXTON Steam Printing Works, is the substance of a paper prepared for a meeting of the Bengal Mine Managers, held at Raneegunge in July 1884, when the subject was brought under discussion at the requisition of the executive, which called for an expression of opinion from those most concerned, as to the advisability or otherwise of enactments to regulate the coal workings. Mr. CHATER deals with the matter exhaustively, eliciting logical conclusions which we think carry conviction with them. He discusses the principal causes that led to legislative 'mining' enactments in England, and shows that they have no parallel in Indian mining. For instance, it may not be "generally known that previous to 1775, the Scottish colliers and their wives and children, if they assisted for a certain period at a coal work, became the property of the coal-master, and were transferable with the colliery, in the same manner as the slaves in the West Indian estates were held to be—property transferable on sale!' Mr. CHATER adds that it was only in June 1799, that colliers were placed in the same position as other labourers, with freedom to exercise their trade. He continues the historical notice of the growth and vicissitudes of the British industry, touching upon the exactions of the masters and the consequent revolt of the miners, which, coupled with the vast development of operations in later years, imperatively called for reform. The change was further accelerated by the disasters in 'mining' assuming such large proportions as to enforce State intervention, with the view of preventing the then too frequent occurrence of such terrible accidents as the Hartly Colliery and other catastrophes. Mr. CHATER shows that the factors which produce such sacrifice of life, do not exist in Indian mining, that the Indian miner undergoes comparatively no risk, and is pecuniarily well off. He adds, on this latter head, that the Indian miner is satisfied with his wages, which have advanced 50 per cent since mining became recognized as an industry in the country, and that he is thus able to earn considerably more than laborers in other callings, due not to his own seeking, but to the "result of competition." Mr. CHATER attributes the present depression in the Indian coal trade, to "the unfair and continued competition of Government in the open market, because of the high freight to which Indian coal is subject, thereby rendering competition with foreign supplies impossible: because of the increasing imports of English coal into the country, which, by the liberal interpretation of a recent Government resolution, should not be allowed to enter our ports. That resolution laid it down that in future all public requirements, *re* stores, &c., should be confined as much as possible to indigenous sources. Yet what do we see? A culpable disregard of the spirit of the resolution on the "part of those who have the disposal of State contracts, or power of making State purchases." This is a matter to which we would call the study of the authorities, likewise to the complaint that while every important branch of industry has received full attention by the local Government, the "mines" only receive a half-dozen lines in the Administrative Report in the place of the statistical statements called for from the owners of the collieries. This complaint is well founded. Mr. CHATER adduces facts and figures to demonstrate the inutility of the proposed appointment of a Government Inspector, and considers that the existing law is sufficient to meet any difficulties that may arise in connection with Indian mining, for many years yet to come. Similar appointments in England have not proved an unqualified success, and they would be worse than useless in this country. He says: "There being no gas in the mines of this district, and one pit to every acre of ground mined, artificial ventilation is unnecessary, and inspection on that score a superfluity." The appointment would therefore be a sinecure. Speaking generally, Mr. CHATER says that legislation on the same lines as the British Mines Regulation Act, would, notwithstanding its beneficial and simple enactments, be incomprehensible to those for whom it was intended, and, if it did not "retard the progress of the industry, would do it very little good. If ever introduced, then all will be chaos and confusion." The why and wherefore are elaborately epitomised in the following excerpt, which embodies the views of the majority of those best qualified to form an opinion on the subject in this part of India:—

> Considering the present harmonious relations between the employer and employed; the perfect freedom of action the latter enjoy under the former; the high rate of wages now paid for mining labour; the almost total absence of accidents and accidental deaths from roof falls, inundations, and other causes; the perfect immunity of the Indian mines from dangerous and explosive gases, rendering artificial ventilation unnecessary; the insignificance of the present Indian coal output, and the comparative nascent condition of the mining industry in the country, the time has not yet arrived for legislation in the manner proposed by the executive.

This is a forcible conclusion to a very interesting pamphlet, the practical value and public import of which cannot be overestimated. It demands the consideration of the authorities, and will be welcome on all sides as the first attempt of its kind, and as the most valuable contribution that has yet been made to the literature of Indian Mining.

SUGARCANE CULTIVATION IN INDIA.

THE following extract from a letter received from Mr. Burrows, of Behea, has been courteously placed at our disposal by the Director of Agriculture, Bengal, and we publish it, as it will be found very useful at the present time:—

The usual Indian method of cane culture may be called *broadcast* as opposed to *planting*, as the term is understood by European and American planters. The difference in results may be approximately obtained by asking any ryot the difference in produce between *cheetwa* and *roap dhan* (broadcast and planted.)

The root of the sugarcane is a small collection of thin fibres or rootlets, there is no tap root. On these depend the health and vigour of the plant with its long succulent stem and succession of long broad leaves; it should, therefore, be placed in the best possible condition to enable it effectually to meet the heavy demand on it.

By the native method the root is on or near the surface of the ground. The field gets 12 or 14 surface ploughings giving a seed bed only four or five inches deep. The little manure (if any is given) is scattered irregularly over the surface, a plough goes round the field in a continually decreasing circle, and the cuttings are dropped into the shallow track so made. There may be a little manure where they fall, or there may not be any. The cuttings are covered with about three inches of earth by a piece of wood drawn over the surface, a man or two standing on it, each supporting himself by holding the tail of the bullock in front of him. This surface covering soon dries; the surface is then loosened a little by the hoe, the roots being carefully avoided. A little manure may now be placed round each plant by hand, and water is let on til the field is submerged or water-logged, thus sealing up the roots from air in plastic clay or loam compressed by the downward course of the water, and hardening as it dries. As the hoe avoids the roots, the compression of the soil around them increases just where it should be most friable. The hoeing is repeated about three times, followed by a *melwanse* watering, that is, till the ground is water-logged each time, When the plants reach a certain height, and the leaves begin to shade the field, hoeing is stopped, and as they grow, being close together with no regularity, a thick jungle is the result excluding sun and free circulation of air. Considering the nature of the plant and the work its root has to do, this treatment of it is most irrational.

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* The Indian Coal-Mines: Is Legislation necessary to regulate their working? By Joseph Chater, F.S.S., Apcar's Collieries, Setarampore. Calcutta: W. Newman and Co., Ld.: 1885.

In Mauritius, West Indies, and other places where cane cultivation is under European supervision, the cuttings or seedlings are laid at least nine inches under the surface of the of the ground, either in carefully-made rectangular oblong holes in rows three and-a-half or four feet apart, or in continuous channels or furrows made by hoe; or double mould board plough, the bottom being flat, and eight or nine inches wide, that is, wide enough to receive three cuttings placed some distance from each other. A field planted in this way will take as many cuttings as are usually put in by the native method. The space between the rows need not be ploughed, only cleaned of weeds by hoe, these are left on the ground, and are covered by the earth from the channels or holes.

Previous to planting the cuttings, manure in proper quantity is spread over the bottom of the channels and mixed with a little earth. On, or in this, the cuttings are laid end to end either in single, double, or triple rows as the width of the bottom may allow, and covered by hand with about three inches of earth. The "hole" system is used in Mauritius, the ground is hilly and undulating, rain is frequent, and each hole retains what may fall into it. In India where irrigation is necessary, the channel or deep furrow method is best. After some days the surface of the soil in the bottom of the channels is loosened by hand. This may be done by women or children, whereas the hoeing of the ryot's field has to be done by men. If water is now necessary, a little is allowed to flow from one end of the channel to the other, and then shut off. As the plants rise, more earth is filled in around them with a little manure where it may be needed; the loosening of the surface, watering and filling in is repeated till the channel is filled; after which, as the plants grow, the earth is drawn from the spaces between the rows and heaped round the roots till a ridge is formed at least nine inches high over the original surface. Subsequent irrigation is given in the hollows between the ridges, the water not being allowed to reach the top of the ridges by four or five inches, which are thus left friable, and open for the action of the air and expansion of the roots.

Our ryots have for years seen and acknowledged the considerable economy of labour, water, and manure in this method as compared with their own. They have also seen the common *mongee* cane of the district so improved that they had to be assured it was nothing else. yet none of them have had the enterprise to adopt it, though several among them have been at work on the cane fields of the West Indies and Mauritius, and know the method and its results.

Cane culture should be more of the nature of garden than field cultivation, and if done with a reasonable consideration of the nature and necessities of the plant, a third of the land, now yearly devoted to cane, could be put under other crops with no falling off in the weight of sugar produced.

The industry, as a whole, and in its details, from the preparation of the land till the crude produce is ready for the market, is in a very backward and wasteful condition; there is no reason except the inertia of the ryot why this should be so. This might be overcome, and a better rut opened out by some sustained effort on the part of Government, probably a graduated set of prizes for the best cane fields cultivated with reference to the nature and requirements of the plant. We know by experience they understand what this means, when explained to them in terms with which they are familiar.

THE VALUE OF EXHIBITIONS.

According to some poetical thinkers, Exhibitions are the "Festivals of Peace," while the matter-of-fact are disposed to view them as gigantic "shows" of varied interests. Be that as it may, there can be no doubt that these institutions are now a recognized necessity of the times. Notwithstanding their recent growth, they already embrace a very extensive sphere of utility, for all classes of the community are interested in their extremely practical and intelligible mission—to materially influence for the better the future welfare of both people and country by stimulating industrial competition. They are the means of comparing the products of manufacture and for general instruction. They offer very substantial encouragement to the inventor, and exercise a very powerful influence on trade. They have an educational effect upon all classes, and as a medium of publicity, are immeasurably more efficacious than newspaper advertising. They were inaugurated in 1851 the Great Exhibition of that year being the forerunner, and the leader of all those which have been held since. In regard to that "show," it was asserted that it would have been the study of a life-time to see all that it contained. From general subjects, these objects have now commenced to be devoted to special aims;—hence, we find, "Naval," "Fisheries," "Health," and "Forestry" exhibitions occurring in England alone, but of an international character, and a host of minor ones repeated *ad nauseum*. Without going far for the practical results of such gatherings, we have the wonderful success of the Calcutta International Exhibition of 1883-84 fresh before us, due to the energy and intelligence of a stranger, M. Jules Joubert. This Exhibition opened the eyes of the world to the immense resources of India, and to the enormous requirements of the country previously unknown or neglected. And this success of the Calcutta Exhibition has awakened the enterprising community of the metropolis of Western India to the advantages of following suit. Exhibitions *draw*—attract a large number of people from far and near; holiday seekers and business men; *reis* and ryot and all classes are in attendance; and such a gathering can only be "good for *local* trade." This aspect of the immediate effect of an exhibition must not be forgotten while we subscribe to, and acknowledge, their wider scope and cosmopolitan advantages. The new Premier, Lord Salisbury, declared in a public speech delivered in connection with the opening of one of these undertakings in 1882, that—"It *is* due to efforts of members of the Royal Family in this country (meaning England) that exhibitions have been introduced as part of the commercial apparatus of the world, and no one who has watched the effects of the successive exhibitions that have been held, can doubt that they have powerfully stimulated the enterprise and intelligence with which the various branches of industry and commerce are conducted." The feeling is, however, that large International Exhibitions are too colossal for the busy people of to-day, with whom *time* is money. A confused panorama means seeing everything and learning nothing. Whereas, in this age of competition, the value of recurring changes in methods of manufacture, and the development of new trades and processes, can only be understood by "comparison." By restricting the field of observation, the mind is better enabled to grasp the industries represented, and to sift, weigh, and retain the information available regarding them. Hence *technical* exhibitions are advocated as the best means of training, instructing, and interesting manufacturers and merchant-buyers in particular domains. In technical exhibitions there is more opportunity and greater facility for makers and users or producers and consumers to be brought into closer relation, which helps generally in an interchange of ideas. This better enables one section of the community to meet the wants of another. The good-will engendered enlists sympathy, obtains encouragement, and commands success—even without the incentive of prizes and awards. For, in technical exhibitions, the scope of which is limited, there is more concentration of inquiry and observation brought to bear on the exhibits, which under the principle of "seeing and judging," would soon evolve the *best* by a process of consultation and comparison. Economy of production, advanced ideas, correct proportion, and good design could be easily detected by the experienced and interested *without* recourse to *practical* "testing," which may mean much or nothing at these shows—the honors of which are, we regret to say, very often acquired by special preparation, inducing abnormal conditions, which anticipate the best results. We have been unconsciously drifting into moral views relative to exhibitions which, perhaps, would be well left to the judgment of the reader. Whether general or technical, there can be no question as to the advantages of Exhibitions. Their good to the community at large is incalculable, and the possibilities in this respect might be exemplified by a single incident:—When the Swiss visited the exhibition at Philadelphia, and saw, to their astonishment, that the Americans were, in watchmaking and other mechanical productions, far in advance of themselves, they at once accounted for their own manufactures being at a discount in the American markets, [illegible] immediately turned their attention towards *im*[illegible]*ent*, in order that they might not [illegible] their own specialities. This is one way in which an exhibition could operate in good effect. [illegible] best argument, however, of the benefits derived from exhibitions lies in the fact that they occur over and over again, and are still coming.

Miscellaneous Items.

THERE appears to be a demand for cattle and potatoes at Sumatra, and a Madras merchant has made a shipment of these from Negapatam, and similar consignments will shortly be made.

ANTHRAX having appeared among the horses of the K. D. Guards, it has been requested that Government Cattle should not be driven along the road from the Fort, leading through the Fort Lines, until further orders.

THE Soldiers' Industrial Exhibition at Poona was opened on the 24th ultimo before a large gathering. There was a variety of exhibits, comprising articles of almost every description, which were so tastefully and attractively laid out as to draw the encomiums of the visitors.

ON the 25th ultimo was the great Hindoo holiday of cocoanut day at Poona when the monsoon is considered to be at an end, and cocoanuts are thrown into the sea to gain its favour. All the banks, Government offices, &c., was closed. In Bombay a large fair is held on the esplanade.

THE pioneer efforts of Messrs Parry and Co., in the direction of expressing oil by steam at their factory at Cuddalore, have proved so successful that the firm are setting up two additional mills, one for pressing castor oil, and the second to meet contingencies such as breakage, accidents, &c.

THE out-going traffic on the Madras Railway, from Bangalore, is very low just now, but an increase is observable in the import of grain, probably owing to the past very indifferent season, and the drought now threatening. Prices, too, are already rising, and altogether, prospects are anything but bright and encouraging.

THE Government of India have, we learn, called for the records of the cases in which the two Judicial Commissioners of Oudh have differed in the construction of the law relating to the resumption of rent-free grants in that province. It may be hoped that a way will be found out of the unsatisfactory situation which was brought to notice in these columns on the 29th of July.

THE Board of Revenue have issued a circular to the Collectors of all Districts except Cuddapah, directing them to forward a statement of the caste to which each of the officer in the Revenue Department belongs, and the names of his relatives, if any, employed in the same district. Such a statement had already been received from Cuddapah during the vigorous *regime* of Mr. H. E. Farmer.

THE steamer *Panama* has just arrived with a cargo of brick coal for the Administration and the machinery for the new oil press mills. The *Panama* met with very heavy weather in the late cyclone off Ceylon, and sustained damage to the extent of Rs. 20,0[illegible], and had to throw overboard some 50 tons of Government coal; the cargo generally, especially the machinery, was much damaged.

A MOVEMENT is on foot, the *Pioneer's* Bombay correspondent telegraphs, among the Exhibition guarantors to urge the Governor to abandon the project definitely. The Exhibition is now hardly likely to be a success. Its postponement in the first instance, and the doubts that have since been thrown over it, have affected its prospects irremediably. And the guarantors very naturally do [illegible] care to face the prospect of having to pay up their guarant[illegible] for the sake of an enterprise that would not bring credit to the [illegible].

NEAR the village of Pusapatirega, in the Vizagapatam district, a spring lately made its appearance, the waters of which were reported to possess great curative properties. News of the discovery spread rapidly, and natives for miles around flocked in numbers to the spot, with the view of being cured of the maladies under which they were suffering. A rough analysis of the water of the spring was made by the medical officer attached to the local dispensary, with the result that it was found to be highly charged with carbonic acid, and it is considered that it might consequently be beneficial in certain forms of disease. Some of the water has also been sent to the Chemical Examiner for further analysis.

Selections.

RULES TO BE OBSERVED DURING PREVALENCE OF SCARCITY.

OFFICIAL PAPER.

From C. S. BAYLEY, Esq., C.S., Under-Secretary to the Government of India (Revenue and Agricultural Department—Famine)—To the SECRETARY to the Government of Madras,—(dated Simla, 23rd June 1885, Circular No. 90-F.)

Now that arrangements have in almost every presidency and province been completed for the promulgation of a Famine Code, I am desired to communicate to all local Governments and Administrations the character of the information which the Government of India is desirous of receiving in respect to any tracts in which there is, or is likely to be, any failure of harvest sufficient to give rise to serious apprehension.

2. The Government of India has not overlooked the provision in the Bombay and Madras Famine Codes of rules prescribing certain reports to the Government of India. To these rules, of which a copy is appended to this letter for easy reference, it has already accorded its approval in sanctioning the codes of the two presidencies. Some matters, however, with respect to which his Excellency in Council would be glad to receive information from affected tracts still remain, which are not sufficiently covered even by these codes, and I am therefore to communicate the following rules (in which the provisions of the Bombay and Madras Codes are as far as possible incorporated) for general observance. The essential difference between the instructions now issued and those contained in the Madras and Bombay Codes is that the latter provide only for a single report, whereas the former provide for periodical reports. But the modification which may be caused from time to time by change in prospects due to fall of rain, or increasing drought, &c., make it necessary to provide for periodical reports during the continuance of scarcity.

3. In issuing these rules, the Government of India wishes it to be understood that it is constrained to consider itself ultimately responsible for the measures taken to meet famine or scarcity, and is at the same time obliged to keep itself acquainted with the financial prospects which any serious failure of harvest may involve. It is hoped that the Government of Madras will not find the instructions conveyed in the rules productive of material inconvenience. Any suggestions which can be made for their improvement will at once receive the consideration of his Excellency in Council.

ENCLOSURE No. 1.

Extract from the Bombay Famine Code.

8. The Governor in Council will, as soon as the approach of famine becomes definite, communicate to the Government of India all available information concerning it, stating the area which is likely to be affected, the economic condition of that area in

ordinary times, the number and class of persons likely to require relief, the crops affected and the extent to which they may be expected to fail, the contingencies on which the probable duration of distress depends, the position of the affected area as to local trade, food supply and communications, the arrangements proposed for famine relief administration and relief works, the extent to which suspension of land revenue may be necessary, the possible requirement of the services of officers from other provinces, and the financial position of the Local Government.

Enclosure No. 2.

Extract from the Madras Famine Code.

When the season and rainfall returns received from the districts indicate the approach of scarcity, the Government will at once report the fact to the Government of India, and when the prospect of famine is imminent, they will further state the anticipated extent of failure of crops, the contingencies on which the probable duration of pressure depends, the area and population likely to be affected, the circumstances of the locality as to trade and communications, the probable numbers that may require relief, the general arrangements to be adopted, the relief works to be opened, the extent to which it is proposed to suspend revenue or to make advances, and what additional officers of different grades and departments may have to be called for from other provinces.

2. The Government at the same time will forward an estimate of the total expenditure likely to be required during the financial year, together with an application *for a* special grant of funds, when the Provincial and Local resources at their control are considered insufficient.

Rules to be observed in reporting to the Government of India the conditions of tracts suffering from failure of crops.

I. The first indications of failure of harvest or scarcity should be communicated in the weekly telegraphic reports.

II. When the indications are sufficiently serious to cause apprehension that, from continued want of rain or other cause, *relief measures may have to be undertaken, the weekly reports* should be supplemented by monthly written reports.

III. The reports should give as distinct information as possible regarding the areas affected (or likely to be affected) and should be accompanied by a sketch map on which such areas should be indicated by colours. A revised sketch map should be submitted whenever the area of scarcity expands.

IV. So soon as the information is available, there should be entered in one or more of the monthly reports—

(*a*) a list of the larger relief works which may, in case of need, be made available for each affected tract or district. If such relief work is one which would ordinarily require Imperial sanction, a separate report should be submitted for communication to the Public Works Department. A rough estimate should be given of the maximum number of people for which, in the event of scarcity becoming famine, relief might be required, and the number which will be provided for by the relief works, of which a list is given.

(*b*) an account of the economic condition of the tract in ordinary times, the crops affected and the extent to which they have suffered, the contingencies on which the probable duration of distress depends, and the position of the affected area as to local trade, food supply, and communications.

V. In the event of relief works or poor-houses being opened, or gratuitous relief being afforded, a summary of the numbers relieved by means of each agency during the month under report should be given. Information should also be given regarding the extent, if any, to which private charity and relief are being afforded.

VI. The rise or fall of prices should be specially noticed in every monthly report.

VI. When any material expenditure has been or seems likely to be incurred, the monthly report should give a brief statement of the amount spent or granted up to date, and an estimate of the available funds from which it is proposed to meet expenditure. If there is any reason to believe that the Provincial funds will prove insufficient to meet the exigencies of famine, the extent to which Imperial aid is likely to be demanded should be estimated.

VIII. The extent to which suspension of land revenue may be necessary should be stated whenever the adoption of such a measure is contemplated.

IX. In the case of serious famine being apprehended in a presidency or province, an estimate of the number of officers of different grades and departments likely to be indented for from other provinces should be given.

X. When in any affected tract cause for anxiety is removed, a request that the tract may be removed from the list of affected areas should be included in the monthly report.

Note.—As a rule it will suffice to give information under IV (*a*) and IV (*b*) once for all, but whenever information is furnished under these heads, it should be distinctly stated that the information is afforded under IV (*a*) and IV (*b*), as the case may be. During the progress of events for better or for worse, the forecast originally given will doubtless be subject to occasional modification.

SUGAR-REFINING BY ELECTRICITY.

In the March *Sugar Cane*, page 116, we called attention to a Company which had just been started in New York for refining sugar by electricity; and we also also gave a report, taken from a contemporary, of some sugars which had arrived in this country, and which, it was stated, had been refined by this process. We gave the account as a curiosity—no more believing it, than if we had been told that some one had arrived in Liverpool that morning having left New York the previous day in a balloon.

Experiments with this new process have continued to be made, with results, as reported, which are simply astounding.

Within the last few days we have seen Mr. Robertson, of Liverpool, who is interested in this company, and represents it in England. No one, we think, can converse with this gentleman without being persuaded that he most thoroughly believes in this invention, and that it really does what is reported of it.

He told us that a [illegible] New York, in order to test the matter, had 3 cwt. of raw sugar taken to the inventor's room, for the purpose of being refined; he satisfied himself that there was no other sugar in the room except that which he had brought with him, and that there was no way by which the sugar could be replaced, except through the door, which he had securely fastened and sealed upon leaving. Within two hours he re-entered the room—during his absence the raw sugar had been passed through the machine by the inventor, and converted into refined sugar, the weight returned being within 1 per cent of the saccharine contents of the raw sugar.

An experiment upon a much larger scale has within the past three weeks been made under conditions set forth in Mr. Robertson's Circular, dated July 17, which we give at page 439, together with the report of the five gentlemen who were selected to certify to its genuineness; we notice that two out of the five gentlemen are the president and vice-president of the company. Assuming, as we do, that all is perfectly square, we think the company would have done better to have obtained the services of five well-known gentlemen who were perfectly disinterested.

The quantity of raw sugar to be refined was 80 bags—producing 40 barrels of refined sugar of "12 different sizes, from the finest granulated up to about the size of a small bird's egg;" the time occupied in the process was seven hours. These gentlemen did not witness the operation itself, but they conclude their report as follows: "We have no reason whatever to doubt that the aforesaid refined sugar was produced by the said (Professor) Friend by his said process on the said 14th July from the aforesaid raw sugar."

The conclusion that one is driven to, with this information before us, is, that it is either a great fact, or it is a great fraud. The company are about starting some works to refine, by this process, 500 tons per day. We shall therefore know in a little while which of these conclusions is the correct one.

IF IT IS A FACT, it means that we are on the eve of a revolution in sugar refining, without a parallel in its history; it means that planters in all parts of the world can, if they choose, and have the capital, refine their own sugars on the spot. It opens up besides, a market for refined sugar with millions of people in India, who, from religious belief, are now debarred from its use on account of the animal charcoal employed in refining under the old system.

The particulars of the invention may be stated to be as follows:—

"The process is an electro chemical one, which is worked by a machine, automatic in its action to a very great extent. Boiling and animal charcoal are entirely dispensed with. No syrups nor soft sugars of different grades are produced, the entire product being hard sugars in whatever forms or sizes which may be desirable to produce, that is, from finest powdered up to and including cut and pressed loaf. One valuable feature in this mode of manufacture is, that all the saccharine matter in raw sugar, whether crystallisable or uncrystallisable, under the old system of boiling and filtering, is by this system rendered into hard sugar, with a small fraction of a loss,—less than one per cent of the whole quantity. The cost of refining by this process is 2s. 4d. per ton (2d. per cwt.), and the time occupied not more than four hours."

By the favour of Mr. Robertson we have been furnished with samples of sugar refined by this process, and which are at our office, 57, Market-street, Manchester, for inspection.—*Sugar Cane.*

GERMAN BEET SUGAR CAMPAIGN, 1885-86.

[COMMUNICATED.]

REFERRING to the figures given to cane planters by Mr. Russell, of Demerara, in his pamphlet in the *Sugar Cane* for April last, "*Reflections on the relative positions of Beet Sugar and Cane Sugar, as produced respectively for refining in Germany and Demerara,*" it may [illegible] uninteresting to your readers to learn what the fabricants in Germany are doing for the 1885-86 crop. As an example I give some particulars of a factory—not a large one—which works up from 1,500 to 2,000 tons of beet sugar for refineries during the season.

The work in question belong to the Peiner Sugar Manufacturing Company, which is under the management of the Technical Inspector, Mr. E. Riecke.

The Peiner Sugar Company have their work in the district of Hildesheim, where the large molasses refinery is making white sugar from molasses only. It is one of the oldest in that locality, and has worked nearly 20 years, showing dividends from 20 to 30 per cent.

Nearly all the roots worked are grown by the Company, and on a soil not at all favourable for beet culture. The factory has paid until now from 20s. to 25s. per ton of roots, which contain on the average 11·5 per cent of sugar. We learn from reliable sources that the Company have entered into agreements with the beet growers for the next crop to pay 70 pfs. per cwt., that is 14s. per ton of beet roots, real sugar beets, healthy, without dirt, the head or tops cut off, and not green-coloured roots, containing, according to the analysis of the chemist, not less than 11 per cent of sugar in the roots to be delivered at the works, and for every 100 tons of beet roots, the farmer or contractor has returned to him up to 38 tons of slices from the diffusion battery.

This well-pressed extracted beet is considered excellent food for the cattle, and, if well prepared, invaluable to the farmer. If, however, the farmer prefers a return in cash, which is not often, he is to receive 4s. per ton. The farmer is provided with the seed by the Company, and none other is permitted to be used.

If 88% beet sugar realizes more than 24s. per cwt., incl[illegible] internal tax, then the Company [illegible] per ton for his roots, in the place [illegible]

These are the general terms at the present time in Germany for 1885-86, [illegible] Peiner Sugar Company is one of those that agreed [illegible] give last campaign (1884-85) the full prices before mentioned namely, 20s. to 25s. per ton, and have settled, without hesitation, with the farmers on this basis.—*Sugar Cane*

SUGAR-CANE AND SUGAR TRADE IN BRITISH BURMAH.

Memorandum by Mr. J. E. Bridges, Director of Agriculture,—dated the 12th August 1885.

THE cane-producing lands of British Burmah may be roughly divided into two tracts—

(*a*) The tract of shifting cane cultivation, in which the cane is consumed in the raw state;

(*b*) the tract of permanent cane cultivation, in which the cane is manufactured into Kyantaga* (gur).

2. The first tract may be taken to include all the lands on the seaboard within the region of tidal creeks, whereas the second tract consists of the lands situated in the interior of the province. Many districts will, therefore, belong to both tracts; thus in the southern part of the Hanthawaddy district, shifting cane cultivation is found in the circles of Lawadi and Eindapura, whereas permanent cane cultivation is found along the railway line in Wanetchaung, Taikkyi, and Okkan.

A.—TRACT OF SHIFTING CANE CULTIVATION.

3. It consists of patches of land cleared in the evergreen jungle which fringes the tidal creeks; the land is, as a rule, poor and will not yield a cane crop two years in succession, so that this kind of cane cultivation is never found in large continuous stretches of country, but only in isolated patches.

4. *Area under cultivation.*—The district returns give the area under cane as follows:—

	Acres.
Bassein ... ... —	320
Thongwa	349
Hanthawaddy	111
Total ...	780

5. *Races of cultivators.*—The cane-cultivators in this tract are, as a rule, Upper Burmans, who have immigrated into British Burmah, and who cultivate cane for two or three years in order to save enough money to buy cattle and cultivate paddy, or to be able to trade on a large scale. They generally combine petty trading with cane-planting and can hardly be called cultivators. The area of their plantations seldom exceeds one acre.

6. *Kind of cane.*—The kind of cane grown in this tract is called kyaukswin or kyaukchaung. It is a large cane of light colour, with short, thick joints, and is so brittle that when passed through a mill it generally breaks off at the joints. It is usually eaten in the raw state, but is occasionally pressed in a hand mill and the juice sold. This cane is very juicy, but the juice contains but little saccharine matter. The cultivators never attempt to make kyantaga (gur) of it, and in describing an experiment made in Thongwa district, the District Officer says: "In this district the juice at its best only yields molasses. No amount of boiling will cause crystallization of sugar. The experiment had a fair trial in the Ma-ubin jail; there not only the inferior but the best kinds also of canes were used, but the result was the same."

7. *Soil.*—The sites selected for cane cultivation are the muddy clay alluvium on the banks of tidal creeks, and they are chosen more with reference to the nature of the timber growing on the land and the facility of cutting it down than to the fertility of the soil. This soil is not generally suitable to sugarcane, but it is sufficiently fertile to grow one crop of the coarse cane cultivated, and cane is seldom or never planted two years in succession on the same patch of land.

8. *Mode of cultivation.*—The timber on the plot of land selected is cut down at the beginning of the dry weather and burnt in March. Vegetables, such as roselle and Indian corn, are planted amongst the ashes and afterwards sold at a small profit. In September, after the land has been cleared of weeds, cane-pieces are planted in holes at a distance of two or three feet. These holes are in rows three or four feet apart; the cane-pieces are fastened down by a piece of bamboo lashing, to prevent them being washed away. In January and February loose soil is thrown up round the young plants, and in May and June supports are placed near each cane stool and canes tied to them with fastenings made of creepers. About August and September the canes are cut and sold in pieces.

9. *Irrigation.*—In some parts trenches are made to admit water during the dry season and drain the land during the rains. In other parts the plants are watered at spring-tides by bamboo water-lifts; but, as a rule, the water from the creek overflows the banks at high tides and no irrigation is necessary.

10. *Cost of cultivation.*—As a rule the cane plantation is cultivated by the owner with his family and no hired labour is employed. The following is an estimate of what the cost of cultivation per acre would amount to if only hired labour were employed:—

	Rs.	A.	P.
Clearing jungle	7	0	0
Price of plants at Rs. 6 per 1,000	18	8	0
Cost of planting at Rs. 2-8-0 per 1,000 ...	7	8	0
Cost of supports at Rs. 8 per 1,000	9	0	0
Cost of creeper lashings at Rs. 5-0-0 per 1,000 ...	9	0	0
Cost of labour for planting supports and binding the canes at Rs. 3 per 1,000	9	0	0
Total ...	60	0	0

11. *Yield per acre.*—The following table shows the yield according to experiments made by District Officers:—

	Area.	Number of canes.	Tons.	Cwt.
Bassein ...	0·29	4,904	11	9
Thongwa ...	1·00	16,960	28	14

The average yield per acre would, therefore, be about 17,000 canes.

12.—*Price of produce.*—The canes sell at Rs. 20 per 1,000, so that an acre would give a return of Rs. 340.

13. *Estimated net profit.*—The net profit per acre would be Rs. 280, if the cost of cultivation alone is deducted; it would amount to Rs. 150 per acre if both the cost of cultivation (Rs. 60) and the cost of living (Rs. 130) of the family were deducted. It must be remembered, however, that these plantations are exposed to the attacks of rats and squirrels, and to the inroads of cattle, so that the full outturn is seldom obtained. It would, therefore, be safer not to estimate the net profit at more than Rs. 100 per acre.

14.—*Condition of the cane cultivators.*—There is no information regarding the condition of cane cultivators as they change from year to year, and become gradually merged into the general body of cultivators or traders, when they accumulate enough money to cultivate paddy, or start as traders.

B.—TRACT OF PERMANENT CANE CULTIVATION.

15. The most important portion of this tract is situated in the valleys of the Bilin and Thébyu rivers (3,191 acres). The manufacture of cane into kyantaga (gur) is also in practice in other districts—Toungoo, Amherst, Kyouk Phyoo, Sandoway; and within the last few years jaggery has been made on the railway line in the Hanthawaddy and Tharrawaddy districts.* The land hitherto selected has been soil which receives annually alluvial deposits and can, therefore, be cultivated continuously without the use of manure. There can be no doubt, however, that a large area of land which does not receive any alluvial deposits could be cultivated either with the present cane or some other variety, but a rotation would then probably become necessary, and these lands are already occupied by Burmans or Karens, who show but little inclination to undertake cane cultivation.

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* Kyantaga is the Indian gur, only it is generally made in the shape of flat cakes instead of in cheese form.

* There are cane-crushing mills working at Wanetchaung, Taikkyi and Okkan in Hanthawaddy, and at Udo and Hrashwegyaw in Tharrawaddy.

16. *Area under cultivation.*—The district returns give the area under cane cultivation as follows :—

Arakan	Akyab	82
	Kyouk Phyoo	[illegible],344
	Sandoway	†1,044
Pegu	Prome	
	Tharrawaddy	
Tenasserim	Toungoo	[illegible]
	Shwegyin	[illegible]
	Amherst	988
	Tavoy	110
	Mergui	138
Irrawaddy	Henzada	...
	Thayetmyo	...
	Total	6,980

17. *Races of cultivators.*—The cane cultivators in this tract are generally Shans and [illegible]aungthus. The Burmans do not readily undertake cane cultivation, which requires constant attention and labour throughout the year and is, consequently, distasteful to them.

18. KINDS OF CANE.—*Madras or white cane.*—The Madras cane is said to have been brought to Bilin from Moulmein shortly after we occupied the country. It grows to a height of [illegible] feet and is so flexible that it requires no supports. It is the cane almost exclusively grown in Burmah for the purposes of kyantaga manufacture.

Kaingyan, or elephant grass cane.—This cane is so called from its resemblance to the elephant grass. It is whitish in colour and grows to the same height as the Madras cane, but is much thinner. It is very flexible and does not require supports. It is indigenous to the Shan State and gives more canes (20 to 25) to each stool, but it is said to yield much less juice than the Madras cane.

Anagyan or Upper Burmah cane.—It is a reddish cane with short, thick joints.

Kyaukgaungyan.—It is a large cane of greenish colour, much resembling the Upper Burmah cane, and has short, thick joints. It is almost exclusively grown in the tidal creeks, [illegible] has been already described (paragraph 6).

Kyannet or black cane.—It is a thin cane of a dark purple colour with green leaves, and yields but little juice. Another variety is said to have purple leaves.

Kyanni or red cane.—This is a small, red cane with thin, hard stems.

The Madras cane is the cane exclusively cultivated for manufacturing purposes, and the kyaukgaung cane is exclusively grown for selling in the raw state. The other varieties are but little grown, they are generally found on the outskirts of plantations, where they serve the same purpose as plantain trees to preserve plantations from the attacks of animals or the depredation of passers-by.

19. *Soil.*—The soil best suited to the cultivation of sugarcane in Burmah is that of the Bilin and Thebyu valleys. It is almost entirely grey loam mixed here and there with light clay. This land is covered during the rainy season by the river floods for a few days at a time, and a thick layer of alluvium deposited on it.

The soil on which cane is grown for manufacturing purposes in the other districts of the province is a generally deep rich loam. The cane-growing soils of the Shwegyin district have been analysed by the Chemical Examiner, Dr. Romanis, and the following is the result of the testings made :—

Analysis of Soils from Bilin.

		A	B	C	D	E	H	K	M
		Soil of the southernmost point to which cane-cultivation extends on the Bilin.	Soil taken [illegible] river opposite to [illegible], where bank is lower and more flooded.	Soil of the northernmost point to which cane cultivation extends on the Bilin.	Soil situate some distance from river bank on which there is no alluvial deposit.	Soil of centre of cane tract ([illegible]aunpalin).	Soil of centre of cane tract (cultivated 20 years) near Bilin town.	Soil of the Thebyu valley (cultivated 10 years).	Soil of the Thebyu valley (virgin soil).
Soluble in hydrochloric acid.	Potash	0·146	·155	0·211	0·165	0·[illegible]70	0·403	0·090	0·285
	Soda	0·050	0·020	0·005	·102	0·050	3·546	0·000	0·000
	Magnesia	0·218	0·560	[illegible]	[illegible]90	1·010	0·182	0·547	0·049
	Lime	0·106	0·023	0·005	0·000	0·250	0·060	0·040	...
	Phosphoric acid	0·114	0·082	0·044	0·024	0·110	0·106	0·161	0·071
	Oxide of zinc and alumina	7·460	6·450	5·270	8·020	9·700	7·100	8·440	8·180
	Organic and water	6·310	4·520	3·140	9·890	4·460	7·248	10·720	17·460
	Total	14·404	11·813	8·774	19·981	16·850	15·705	19·998	25·995
Soluble in sulphuric acid.	Potash	0·748	0·556	0·228	0·260	0·181	0·168	0·080	0·160
	Soda	0·000	0·000	0·801	0·000	0·295	·160	0·040	0·032
	Lime	0·084	0·290	...	[illegible]	...	0·052	trace	
	Magnesia	0·802	0·065	0·451	...	0·230	0·503	...	0·730
	Alumina	8·200	7·610	4·730	14·300	6·000	8·040	18·840	25·119
	Total	9·824	8·521	6·211	14·580	7·606	8·8[illegible]	18·940	26·081
	Insoluble matter and sand	75·762	79·066	85·015	65·430	75·544	75·472	11·062	47·92[illegible]

Dr. Romanis says :—

"These soils are evidently produced by the decomposition of granite or some other primitive rock. In the sample of E, I found fragments of decomposing felspar, the constituent of granite that supplies potash to the soil. There is no doubt that this is the secret of the fertility of these soils. Another thing is that the soluble potash is higher than usual. They will yield several crops before they show signs of exhaustion."

20. Canes had been cut on the land from which the selections were made, the juice tested, and the amount of kyantaga (gur) obtained had been ascertained with the following results :—

Name of soil.		Percentage of sugar in juice according to saccharometer.	Percentage of coarse sugar (gur) in juice according to experiment.
Bilin valley ...	A	25·71	15·27
	B	20·00	12·52
	E	25·71	15·27
	D	22·85	14·31
	C	...	Not cultivated.
	H	22·85	14·31
	K	27·14	17·00
	M	...	Not cultivated

The percentage of juice was, however, taken from the different places at different times, and there was a month's interval between the testing of H and that of K. The cultivators themselves stated that the best kyantaga (gur) was produced by soils A and E, then by H, then D and K, and finally B. They stated that the dyantaga (gur) of B was bad owing to the land being flooded, and that the sugar of K would improve as the land was regularly cultivated year after year.

21. Comparing the result of the soil analyses with that of the testing of the juice and ky[illegible]ga (gur), Dr. Romanis remarks :—

"The order of the productiveness seems to be that of the amount of phosphoric acid the soil contains. Leaving K out of account, as it was more mature when cut, it will be observed that the sugar obtained is very nearly proportional to the percentage of phosphoric acid. According to Ville, the phosphate of lime is the predominant constituent in sugar manure, but he gives no experiments to prove it. H is third in order of phosphoric acid, and third in order of productiveness. The great excess of potash cannot be utilized by the plant for want of a sufficient proportion of phosphoric acid. K, according to the natives, comes after D ; but D is new land and, therefore, for a year or two, may yield good crops ; but, if the analysis fairly represents its composition, it cannot last long.

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† The paukyan of Sandoway is probably the Madras cane, which is also known under the name of paungkyan.

"It is no doubt beginning to be exhausted of its soluble ingredients. What is extracted by hydrochloric acid does exactly correspond to what the plant can extract from the soil. I should say it wants a fallow or change of crop.

"The soil should not deteriorate if nothing is removed from it but pure sugar, the constituents of which are entirely obtained from the air. If the crushed canes are restored to the land in any form, there is no loss, or very little, of mineral matter."

(To be continued.)

REPORT ON MINERALS IN TENASSERIM.

Iron and Manganese.—I received some specimens of iron ore from the Commissioner of Tenasserim. They had been sent in with an application, for mining rights, and I was asked to report on their value. Analysis showed that the ore was free from sand and rock, but several specimens contained a large quantity of manganese—one as much at 45%. Since manganese is more valuable than iron, it was important to ascert[illegible] there were deposits of pure manganese in the neighbourho[illegible]

I found that the specimens came from Yetagon, a few miles above Yembaing, a large village on the Salween, about [illegible] 80 miles from Moulmein.

Yembaing is about two miles above the rope stations on the Salween, where the logs from the forests on the Upper Salween and Thaungyin are collected.

Above Yembaing the river flows through a gorge, where the current is interrupted by huge, rugged rocks, which must make the navigation impossible during the rains.

The iron stone deposit is seen on the east bank of the river for 300 yards northward from the waterfall at Yetagon. It was observed about two miles further up, on the west bank, exposed in a water course about 210 feet above the surface of the river, and again at Badattha on the west bank, near the flood-level of the river.

The rocks to the east of the river and in the river are composed of a poor limestone containing only 22 per cent of carbonate of lime and 78 per cent of sand. To the west the rocks are sandstones, ferruginous schists, &c: to the south-east again we have limestones containing 75 per cent of lime. The dip is 60° to [illegible] W.

The iron ore has evidently [illegible] deposited in a stratum of the limestone, and left as a line of nodules lying along the outcrop by the weathering of the limestone.

These nodules are many of them hollow with crystals of oxide of iron lining the cavities they frequently contain crystals of quartz and carbonate of lime.

Some nodules contain an appreciable quantity of manganese evolving chlorine gas when treated with hydrochloric acid, but not enough to be useful for making bleaching-powder. The majority of the specimens are oxide of iron of g[illegible]rity.

The ore may easily enough be brought down to Moulmein in the dry weather, but the price of English iron i[illegible] than the cost of working and carrying it would be.

Thin films of a black substance are often found coating the rocks in the neighbourhood. This proves to be 'wad' or earthy manganese, in which Mr. J. T. O. White has found a trace of barium. It is probable that larger deposits may be found some day. I showed the people who guided us what to look for, and I hope we may hear of some discovery.

In the meantime manganese may be added to the list of minerals found in Burmah. The remark on page 13 of Mason's Burmah (Theobald's edition) should be expunged.

Analysis.

Black nodule from limestone, Yembaing:—

Peroxide of manganese	9·59
Peroxide of iron	11 74
Carbonate of lime	35·63
Sand	39·43
Water by difference	3·61
Total ...	100·00

contains traces of barium.

Manganese from Yetagon—

Peroxide of manganese ...	50·83
Peroxide of iron ...	31·50
Protoxide of iron	7·20
Sand	3·25
Water	7·72
Total ..	100·00 gives 6 83 available oxygen.

Limestone, No. I—

Carbonate of lime ...	22·75
Sand, &c.	77·25
Total ...	100·00

Limestone, No. II—

Carbonate of lime ...	69·13
Iron and magnesia, carbonates, &c.	31·87
Total ...	100·00

Kawkareik and Thaungyin Valley.

Kawkareik is 15 miles from Kyundo, a village on the Haungtharaw where the launches from Moulmein stop. For some three or four miles from Kyundo, the soil is alluvial and occupied by rice cultivation; then, to the neighbourhood of Kawkareik, we have undulating ground composed of a decayed metamorphic rock containing much iron covered with an open forest of in trees. To the south and east of Kawkareik the country is level and under [illegible] cultivation. The cultivators are principally Shans. To the North-east the country is undulating and covered with forest, with taungya cultivation. The road to Myowadi runs along the channel of the Kawkareik stream—at this season a few inches deep [illegible] quite impassable for wheeled traffic. Goods are carried [illegible] elephants, or bullocks with panniers. I found it impossible [illegible] elephants [illegible] account of the outbreak of elephant-disease and cholera, which [illegible] frightened the Karens from coming into the town. I therefore left my heavy baggage behind, and travelled with a caravan of bullocks carrying rice to Myawadi.

There seems to be a considerable trade done in this way in rice, tinned biscuits, shot and iron goods.

[illegible] hours from Kawkareik the path leaves the valley and [illegible], running along the edge of a precipice. The [illegible]. The principal trees are *Dipterocarpus* of [illegible] species, which attain a height of 150 feet. The undergrowth is a tangled mass of bamboo and creepers of all sorts. The rocks of the Dawna range are metamorphic, micaceous, iron ore, schists, gneiss, and granitic rocks.

The usual halting-place is at an old zayat five hours' walk from Kawkareik (cattle require eight hours); after this the road is generally down hill, until we got clear of the mountains at Thingannyinaung, 4½ hours from the zayat. Here is a police station and a small settlement, with taungya cultivation on the banks of a small river, a tributary of the Thaungyin flowing north-east. The road leads almost due east to Myawadi through open in forest; the soil is a decomposed ferruginous rock with bands of quartz. Near Myawadi the in forest is replaced by bamboo, and traces of former cultivation in the form of bricks scattered about are seen.

Myawadi now occupies about one-tenth of its former area as marked by the old walls. It is inhabited principally by Shans. The Thaungyin river is fordable everywhere in the dry weather, and does not form a natural boundary. The Dawna range seems to be the real division between the races. The Yahaing road here crosses the river from the south-east corner of the town.

There was much sickness in the place, and one of our bullock-drivers was seized with cholera. It was some time before I could get transport to the next halting-place, Ledangyi, better known as Shwe Ki's village, from a Karen chief who lives there. The road passes through a mixed forest. Near Ledangyi there are rice meadows belonging to Shwe Ki, said to be the only example of that kind of cultivation in the neighbourhood. There is also a large orchard filled with fruit trees and well kept.

The hills here are close to the river. They are composed of a very pure limestone, in some places passing into marble. Between the limestone and the river there are low hills of red clay. In the bed of the river the rocks are composed of a much decomposed granitic rock. Half-a-mile from the village, south-east, there is a section where a recent gravel bed lies on metamorphic rock; above the gravel we have a red clay and laterite.

In the limestone I found marks resembling a Devonian coral, which occurs in the neighbourhood of Bristol, but the rocks have been much altered by igneous action, and the traces are faint. I found no minerals, but a piece of bituminous shale was brought to me, said to have been found in the river. It was waterworn, and could not have come far without being broken up in such a stream as the Thaungyin; but I did not find the stratum from which it came. It resembled in appearance the Lenya coal of Tenasserim.

About two hours from Ledangyi the river flows through a gorge between precipitous limestone rocks. The road is impassable for elephants, which here wade along the stream. The footpath runs along the riverside, then ascends and runs into a ravine; about 230 yards from the entrance the path enters the bed of a torrent, rising in the mountains beyond. This stream disappears into the ground through a circular hole between three and four feet in diameter. It no doubt enters the river below water-level.

After wading along the bed of the stream for about a quarter of a mile, we come to its source in a circular valley surrounded by steep limestone rocks called "Uya." This appears to have been a Karen stronghold. It was planted with fruit trees for the benefit of traveller by the father of the present Karen chief of the district. It is kept in order by two or three Karens, who live there and make thatch for houses. The garden is irrigated by the stream, which never dries up. The fruit trees were orange, lime, guava, jack, mayanthe, mango, betel-nut, with plantains and pine-apples. The exit to the south-east is through a narrow ravine and down a dry torrent bed. The road runs through a mixed bamboo jungle and then through an open forest resembling the in forest. The place of the in tree is here taken by another species of *Dipterocarpus*. The soil is a red clay with fantastic blocks of limestone rising through it. The next halting-place is Kemau, a large Karen village, lying at the foot of a range of limestone hills, which run parallel to the river. The low hills near the river are composed of grits and conglomerates. The open forest extends over these low hills as far as Panya. The jungle on the limestone is exceedingly dense; it is only in taungyas that there is a chance of examining the rocks closely. At Kemau I found no fossils, but found pink and green fluor-spar in the limestone. This mineral often accompanies metallic veins, but I found none here. The road runs along the riverside, and then over low hills with open forest until the Meka I river is passed; the road here divides,—to the south east it goes through alluvial forests to Panya, to the south-west it runs by the riverside to the village of Mekala. The limestone rocks disappear, and the gorge of the Mekala river is composed of metamorphic rocks like the Dawna range. At the entrance to this gorge I observed a conglomerate dipping 30° N. This is the [illegible] place where I found a good section of the strata. The rocks are generally indurated shales.

I here found a hot spring; the temperature was not over 120° F. It is about a mile from the meeting of the roads.

Towards Panya the road passes through alluvial plains covered with an open evergreen forest; it crosses the Ankaren and Ankraw streams and then the Gala, on which Panya stands. It is a small Karen village; the people are engaged principally in forest work. There are a few taungya gardens near.

Panya is the nearest village to Ankaren, where Mr. Fryer reported the existence of lead phosphate. The people could not [illegible] me to the place, and had never heard of it. The country [illegible]sts of low hills composed of red clay from the weathering of [illegible]morphic rocks. The people said there was no limestone in the [illegible]urhood nearer than half-a-day's journey. The lead ore m[illegible] Mr. Fryer, if it was near the junction of the Ankaren neig[illegible] streams, must have been in metamorphic rocks above found [illegible] not in the limestone. There is little chance, and Ankr[illegible]ing the phosphate of lime as I hoped. I was mentioned a[illegible] the search by the rapid rising of the therefore, of [illegible]mencement of the rains. Although the compelled to give [illegible] attained, yet the geological formation of rivers, due to the o[illegible]ved for the first time. There remains primary object was not [illegible]ne in the Thaungyin valley. There the district has been obs[illegible]logical character of the country a great deal of work to be d[illegible] and Hlaingbwe. Also the is nothing recorded of the [illegible] to have been geologically between Shwegun or Yemba[illegible] over the mountains from Haungtharaw valley does not ap[illegible] a valley between examined. I returned to Kawkareik [illegible] with bamboo Ledangyi. The road runs westward thro[illegible]nganyinaung limestone mountains, the lower part, cove[illegible] then jungle, passing the sources of the Mekana and [illegible] streams. I followed the latter to Thinganyinaung [illegible]re-crossed the mountains to Kawkereik. At first there are [illegible] stone rocks on both sides of the valley but going northward, we find sandstones and shaly cropping up, and the limestone forms the crests of the hills, the valley widens out, and there are rice fields cultivated by Shans; then the hills sink down into the undulating country between Myawadi and Thinganyinaung. Thus we have a tract of limestone country south-east of Thinganyinaung overlying the shales, schists, &c., which form the Dawna range and re-appear on the Mekala river.

From the mountains near Kemau we have a good view of Siam as far as Yahaing. The country appears a table-land, elevated about 300 feet above the Thaungyin river, intersected with ravines and covered with forest resembling in forest. About 20 or 30 miles from the river is a range of mountains running north and south, parallel with the Dawna range. From the outline I judge it is of the same geological character. It appeared to be less impassable than the Dawna range, the mountains seeming to stand apart from one another.

Limestones, Thungyin Valley.

I.—Carbonate of line	...	...	..	99 03
Oxide of iron	...	...	...	0·50
Oxide of manganese	...	...	...	0·20
Magnesia	...	...	...	0·26
		Total	...	99 99

II.—Fluoride of calcium	...	...	... 100 per cent

III.—Conglomerate—

Silicate of alumina and iron with trace of manganese.

IV.—Rock from Panya—

Silica	...	...	...	91·68
Alumina	...	...	...	6·60
Oxide of iron	...	...	...	1·76
		Total	...	99·97

Dondami.

The existence of lead and copper ore near Duyinzeik on the Dondami river has been reported. The place is about five miles from the station of the Duyinzeik and Thaton railway. A precipitous limestone rock rises out of the river on the left bank.

The traces of copper turned out to be green stains produced by a species of *conferva*.

The rock is a very beautiful white marble and well adapted to architectural purposes. It has been proposed to use the Ataran limestone for some ecclesiastical buildings, but I do not think it can surpass the Dondami marble in colour or in the accessibility of its situation.

Nodules of a hard stone occur here and there on the surface of the marble. These were analysed and found to be almost pure silica. They resembled chalk flints. Some were hollow, the cavity inside being filled up with limestone. The variation in the composition of the limestone from Yembaing southwards shows it to have been deposited in a gradually deepening sea. At Yembaing we have clay and sand mixed with the carbonate of lime; further south clay without the sand, as in the dark blue limestone of the Salween valley. Then at Dondami we have the pure carbonate, with nodules of silica representing silicious sponges living on a still sea bottom.

THAT HUSBAND OF MINE

Is three times the man he was before he began using "Wells Health Renewer." Druggists.

A. W. Mason & Co., Calcutta, Sole Agents.

BOOKS ABOUT THE DAIRY.*

MANY well-educated people know next to nothing about the manufacture of cheese, and very little about that of butter; but they need no longer be ignorant on either subject, as the two books under notice will supply them with all the information that can well be learned by reading about the dairy. The big book is well worth reading both to those who keep cows and to those who consume their produce; but readers who master the contents of even the little book will know a great deal about the matter. Both works are equally readable; and, as the smaller is a sort of condensation of the larger, this is much to say in its favour, for concentrated literature is usually of the driest description.

Mr. James Long starts with the theory that, "although both corn and beef are often, very often, grown at a loss, yet milk, cheese, and butter almost always fetch remunerative prices"; and he seems to think that dairy farming is the key to profitable agriculture. In comparing the number of cows kept in Great Britain and Ireland with those of other countries, he finds that we have only 1 cow to 12 cultivated acres, whereas in Germany there is 1 to 7, in Sweden 1 to 6, in Belgium 1 to 7 or 8, in Hol[illegible] 1 to 5, and in Norway 1 to 4, while even in "France, the band [illegible]" the proportion of cows to cultivated acres is about equal to our own. [illegible] farming [illegible] according to the author, has been developed in this country, it has been calculated that our annual production of milk is worth forty-seven millions sterling; yet we import about as much butter as we produce, and four-fifths as much cheese. It is unsatisfactory to reflect that of the milk consumed throughout the country, 22 per cent is adulterated, and that little more can be said for the butter. In a Report of the Local Government Board, it is stated that Londoners alone pay "between 70,000*l*. and 80,000*l*. a year for water sold under the name of milk." Yet the percentage of adulteration is said to be higher in Salford than in London. At the same time it will be a comfort to many to know that their milk is adulterated with water, and as a rule, water only. While on the subject of the poverty of the milk sold in towns, we may observe that it is as often owing to quality of the food given to the cows as to the use of the pump. Grains and distillery wash are largely used by dairymen who supply towns and cities, for it is well known that such food makes cows produce a very great quantity of milk, and of a proportionately poor consistency. Adulterated butter must on no account be confounded with the substance known as butterine. That food is manufactured in various countries both in Europe and America, but the greater part of that which is used in England comes from Holland. Butterines and margarines consist of the refined fat of beef mixed with skim milk, the former, when prepared for use, being known under the name of oleo. It is the fine internal fat of the steer, and after being washed, ground, and thoroughly melted in large cauldrons, it is wrapped in clean white cloths, and placed in a press where a hydraulic force of many tons is brought to bear upon it, when a yellow oil, much like olive oil in appearance and consistency, exudes and runs off into tanks of hot water. This oil is still refined and further purified, and finally it is allowed to "solidify, when it is packed in casks and stored." At one large manufactory in the Netherlands as much as 50 tons of this oleo are [illegible] weekly to 12,000 gallons of milk. In this particular case the [illegible]terine is improved by the addition of twelve tons of real [illegible], which give a "grain" to the artificial production.

An industry which has increased greatly of late is that of condensing milk. To reduce milk to about one-sixth of its bulk, and to put it in a condition in which it will keep for a length of time, is

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* *British Dairy Farming.* By James Long. London: Chapman and Hall. 1885.

The Dairy of the Farm. By James Long and J. C. Morton. London Bradbury and Co. 1885.

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Health, Crop and Weather Report.

[FOR THE WEEK ENDING THE 2ND SEPTEMBER 1885.]

General Remarks.—Very slight rain has fallen in the Madras presidency during the past week. In Bellary rain is urgently wanted, and prospects are reported to be very discouraging. In Madura, Coimbatore, and Salem prospects are also unfavourable. Rain is also wanted in Kurnool, Ganjam, Kistna, and Tanjore for the standing crops. In Mysore the situation remains unimproved, as little or no rain has fallen during the week under report. Generally speaking, prospects are fair in the hill tracts, but unfavourable in the plains and it is believed that, if rain does not fall within the next fortnight, there will be a great loss of the dry crops of the province. In Coorg the season continues favourable.

In Bombay rain has fallen generally in all districts, but more is wanted in several talukas of the Deccan and Southern Mahratta country. Crops are withering in parts of Poona, Ahmednuggur, Sholapore, Dharwar, and Bijapore, and fodder is scarce in parts of several districts. In the Berars and Hyderabad more rain is wanted for the standing crops. In the Central Provinces wet weather prevails, and a break is much wanted in the northern districts. Crop prospects are favourable. Rain has been almost general in the Punjab, and the *kharif* prospects continue good. In the North Western Provinces and Oudh rain has fallen in most districts, causing injury to crops on low lands. General prospects are good, but a break would be very beneficial. General rain has fallen in all districts in Bengal during the week, but in places in the Rajshahye division and Behar more is wanted. Excessive rain and floods have caused considerable damage, particularly to the ripe *aus* crops in the Burdwan and Presidency divisions and the *bhadoi* crops in Behar and Chota Nagpore have also been injured to some extent. The *aus* harvest is progressing, and the transplanting of *aman* is nearly completed. In Assam the weather is seasonable and prospects generally good. In British Burmah ploughing and transplanting have been nearly completed.

Cholera continues to be prevalent in the Madras and Bombay presidencies, in Raipore in the Central Provinces, and in some districts of the North-Western Provinces. Elsewhere the public health is generally fair, and prices are fairly steady, except in Bengal, where the price of rice continues high, and in Mysore, where prices show a slight tendency to rise.

Madras.—General prospects fair, improved in Anantapore, in Bellary very discouraging, in Madura, Coimbatore, and Salem reported to be unfavourable.

Bombay.—Rain in most districts, more wanted in several talukas of the Deccan and Southern Mahratta country districts. Crops withering in parts of Poona, Ahmednuggur, Sholapore, Dharwar, and Bijapore, and damaged by excessive rain in parts of Surat and by insects and blight in parts of Kurrachee and Hyderabad, fodder scarce in parts of Nasik, Ahmednuggur, Sholapore, Khandesh, Bijapore and Belgaum. Cholera general, fever and cattle-disease in parts of nine, and small-pox in parts of two districts.

Bengal.—General rain has fallen in all districts during the week, more rain is wanted in places in the Rajshahye division and Behar. In parts of the Burdwan and Presidency division excessive rain and floods have caused considerable damage particularly to the ripe *aus* crops, for the same reason the *bhadoi* crops in Behar and Chota Nagpore have been injured to some extent, elsewhere the agricultural prospects are satisfactory; the *aus* harvest is progressing, and the transplanting of *aman* is nearly completed. Price of rice continues high throughout the province. General health is good, but fever is appearing in some districts.

N.-W. Provinces and Oudh.—Heavy rain has fallen in most districts, causing injury to crops on low lands and to houses in Furruckabad. General prospects are good, and would be better for a break. Markets well supplied. Prices steady. Cholera continues in some places, has abated in some, and has broken out in others; general health, however, of men and cattle is good.

Punjab.—Rainfall almost general. Health and *kharif* prospects good. Prices generally stationary.

Central Provinces.—The weather has been very wet in the northern districts, and clear weather is much wanted. There has also been heavy rain in Chuttisgurh, elsewhere the weather has been fine, with occasional showers, and has been very suitable for cotton and millets.

British Burmah.—Slight cholera in three districts; small-pox slight in one district, elsewhere public health good, cattle disease severe in one district, slight in six districts, elsewhere health of cattle good. Ploughing and transplanting nearly completed. Rains seasonable.

Assam.—[illegible] crops good, *aman* suffering from want of rain in one part of the district. Reaping of *dunshi* and *murali* crops finished; transplanting of *sali* crops continues. Common rice 15 seers per rupee. Weather is too dry for [illegible]. Health good.

Mysore and Coorg.—No profitable rain since last report. Dry crops in critical condition. No present appearance of rain falling soon. Pasturage and water reported to be failing. Cattle in poor condition. Public health fair, only 20 cases of cholera reported during week. Prices show a slight tendency to rise. Generally speaking, prospects are fair in the hill tracts but unfavourable in the plains, the common opinion is that if rain does not fall within the next fortnight there will be a great loss amongst all the dry crops of the province.

Berar and Hyderabad.—More rain needed to prevent standing crops being damaged. Cholera still prevails in the city and suburbs but general health in the district is good. Prices—wheat 14, white *jowari* [illegible], coarse rice [illegible], yellow *jowari* [illegible], and tur [illegible] seers per current sicca rupee.

Central India States.—Total rainfall [illegible]. Flood at Rewah on night of the 24th ultimo, after fall of 12·0, considerable damage to house property but no loss of life. Cholera still reported from several districts of Rewah, otherwise health good. Prospects fair. Break much needed.

Rajputana.—Tanks full, wells filling. Crops and health good. Indian corn and *jowar* in parts slightly damaged. Prices stationary. Weather fine, apparent break in monsoon.

Nepal.—Health and prospects good. A few cases of cholera only.

Letters to the Editor.

OUR JUTE INDUSTRY.

TO THE EDITOR.

SIR,—The state of our Jute industry, as revealed in most of the published balance sheets during the past eighteen months, is very far from being creditable. One would think in looking over these documents, that the great end of a Jute Mill was not to make money, but to lose it as fast as possible. But then of course it is other people's money, and that makes a difference. What can be the reason for the continuation of so insane a policy? Is it for the purpose of supplying coolies with work? Or from a benevolent desire to supply bags steadily under cost price? Or is it simply that the Managing Agents may go on reaping a handsome commission, as long as the poor goose is able to hold out under the killing process? One thing is certain, were these Mills personally owned by those more immediately responsible for their management, they would not go on full swing as at present, with a palpable loss staring them in the face, of from ten to fifteen thousand rupees a month, exclusive of tear and wear of machinery.

A Jute Mill Association was recently formed from which great things were expected, but it was speedily found that on one point—and that the most vital for the moment—the Mills would not "associate," viz., the curtailment of production. Each therefore did that which was right in its own eyes. Some, such as Howrah and Budge-Budge, boldly shut their doors; others, such as Champdany and Wellington, cut off one third of their production, while the greater number rattle away, shuffling out their rupees by the thousand, and the supine shareholder stands looking on, as dumb as the sheep before her shearer. I understand that although the members of the Association failed to bring about the one step which would have cured the present distress, they still meet once a week, and amuse themselves by passing harmless resolutions, fixing the minimum prices of bags, and separating with the charitable hope, if not belief, that all will be loyal to these prices until they meet again. Any attempt to galvanise prices, while production keeps ahead of demand, is an idle dream. The weekly meeting itself is a good thing, as it will enable the office *chokras* who manage the Jute Mills, to compare what they call their "ideas" together, and will leave them less at the mercy of the story which the broker tells concerning the rate which a neighbour is willing to accept, rather than lose the order. But the next time they resolve to fix the minimum prices of bags, I would recommend them at the same time to pass an order fixing the minimum height of low water at Kidderpore and they will find that the Hooghly will be as obedient to their behests, as the Jute trade will be, under present conditions. The agents of the Steam-Ship Companies met the other day in solemn conclave, and ordered freights to go up five shillings. Freight smiled when he heard the order, and putting his finger to his nose in a metaphorical manner, promptly went down half-a crown. So much for the nostrums with which our modern mercantile Canutes would seek to stem the present tide of trade depression.

For the present sickly condition of the Jute trade—unless the disease is to be allowed to cure itself by the elimination of the weaker mills—I confidently affirm that there is no remedy of a feasible kind possible, except the curtailment of production within the limits of demand. Were this policy adopted at the bidding of the shareholders (it is useless to expect managing agents to do it of their own free will), then matters would speedily right themselves at both ends; the price of raw material would go down, the prices of bags would go up, and profits would be made. Will the shareholders move?

While speaking on the subject of curtailment of production, I venture to hazard the opinion that even in ordinary times, the Jute mills are run far too many hours per week. They work during all the daylight there is, from Monday morning till Saturday evening. The consequence is that it is simply impossible to keep the machinery in the state of cleanliness and repair that ought to be its normal condition for effective work. In such circumstances rapid deterioration sets in, and there are some mills at the present time whose machinery is in such a deplorable state, that as a matter of fair market valuation, it is not worth much more than 60 per cent of what it stands at, in the block-account. These long hours, too, are unfair to the European assistants at the mills. If the machinery has to work six days, the majority of these assistants have to work for seven, as Sunday is the only time for cleaning and repairing. Need it be wondered at then, that many of these men break down under the exhausting nature of their work? I am firmly convinced, and I believe the more experienced of the working managers of the Jute Mills would agree with me, that these long hours are a mistake even from a profit-and-loss point of view. I make bold to affirm that if the Jute Mills had wrought only 60 hours per week, which is 4 hours more than they do at home, giving suitable meal hours during the day and stopping altogether on the Saturday afternoon for general cleaning and overhauling of machinery, not only would as much money have been made, but the mill properties themselves would have been in infinitely better condition, and more easily kept in proper order than they can possibly be at present. Thirty per cent of the workers could have been dispensed with, and the European supervision would have been much more effective. The majority of the Europeans connected with the mills would hail with delight the advent of a 60 hours' Factory Act for India, and we do not believe the shareholders would have any cause to regret its introduction. But for present salvation, I earnestly hope that common sense will assert itself, and production be lessened until demand overtakes it.

A. B.

Editorial Notes.

The latest reports from the tea districts in Assam and Cachar are generally favourable, although cold nights are beginning to be complained of both in Jorehaut and the Darjeeling districts.

⁂

The value of the gold imports during the first four months of the current financial year was Rs. 1,37,47,713, and of that exported Rs. 10,14,505; whilst the value of silver imported was Rs. 4,85,14,487, and of that exported Rs. 20,32,910. This leaves a balance of both metals in favour of imports of Rs. 5,92,14,785.

⁂

The assay value of coins and bullion received in the Indian mints in the months of April, May, June, and July last, was Rs. 4,76,81,500, and of that coined and examined Rs. 4,92,80,941. Of this latter amount Rs. 1,81,70,706 was coined at the Calcutta Mint, and Rs. 3,11,10,235 at the Mint in Bombay.

⁂

The salt market during the first quarter of the year 1885-86 showed considerable dulness as compared with the corresponding quarter of last year. The quantity of salt of all descriptions cleared this year was 21,29,121 maunds, against 24,78,324 maunds, and the net amount of duty levied was Rs. 41,03,558 against Rs. 47,90,905.

The exports of Tea from China and Japan to Great Britain, from the commencement of the season to the 13th of August, amounted to 84,963,534 lbs., as compared with 76,473,962 lbs. in the corresponding period of last year. The quantity exported to the United States and Canada during the same period was 25,290,148 lbs. as against 31,142,214 lbs.

⁂

The summer session of the Royal Agricultural College at Cirencester having come to a close, the diplomas, medals, scholarships, certificates and other distinctions won by the successful students were distributed by the Principal. Among the winners of distinctions, we note the names of Baboo Byomkesh Chakravarti, M.A. (Bengal Government scholar), and Pestonji Rustomji Mehta (Indian student), who have carried off diplomas. Honorable mention is made of Messrs. Mookerjee, Banerjee, and Khasheras, all Indian students.

⁂

In a despatch dated June 23rd, the Secretary of State for India acknowledges the receipt of the letter of the Government of India in the Revenue and Agricultural Department, dated 12th May last, recommending the continuance, for a term of two years, from 15th August, of the appointment held by Mr. Mills, of Cattle-Disease Inspector, Madras Presidency, and Veterinary Lecturer for the Agricultural School at Saidapet. He says he is prepared to sanction this arrangement, and to assign to the post in question a consolidated salary of Rs. 800 per mensem, subject to any modifications which may hereafter be necessary on the organization of a Civil Veterinary Department.

⁂

We understand that, at a meeting of the Orissa People's Association recently held at Cuttack, it was resolved to address the Commissioner of the Division, on the subject of holding an Agricultural Exhibition at Cuttack during the ensuing cold season. A similar movement has been set on foot at Chinsurah. These are hopeful signs that the people are becoming alive to the importance of introducing improved methods of agriculture into their lands. It should be the duty of the Government to encourage and foster this feeling; and to place every facility within the reach of associations, and other corporate bodies, which have taken the initiative in a matter of such importance. They should not only be encouraged, but helped and supported in their efforts.

According to the quarterly return of the Registrar-General, the population of the United Kingdom in the middle of 1885 was estimated at 36,325,115 persons; that of England and Wales at 27,499,041, of Scotland at 3,907,736, and of Ireland at 4,918,338. In the United Kingdom the births of 285,612 children, and the deaths of 176,256 persons were registered in the three months ending 30th June. The natural increase of population was therefore 109,356. The registered number of persons married in the quarter ending 31st March 1885 was 105,464. The birth-rate in the United Kingdom in the second quarter of 1885 was 31·5 and the death-rate 19·5 per 1,000. The marriage-rate in the first quarter of this year was 11·8 per 1,000.

***

A contemporary refers to a "valuable invention" in the following terms:—The present yield of gold in the world is about £20,000,000 sterling yearly. It is computed that there must be at least 100,000,000 of tons of tailings on the different gold-fields of Australia that have had only a portion of the gold taken out. Mr. Henry Moon, late of the Mysore Gold Field, announces that after years of experiments and practical working, he has produced a machine that can, without attention, and at a cost of not over 1s. a ton, save 90 per cent of the gold in different ores, and practically the whole when the gold is free. It is to be hoped that this is true. Australian and Californian gold-seekers acknowledge that they fail to extract much more than half the gold contained in some of the gold ores.

***

We understand from a home contemporary that the prospectus of the Fibre and Planting Company of South India is now in circulation, and subscriptions are invited to a share capital of £20,000. The directors are Mr. C. E. Collyer, Colonel F. Henderson, and Messrs. A. R. Hinde and [illegible] Mackenzie. The chief object of the company is to be the growth of rhea, but this will be supplemented with that of tea, pepper, rubber, tobacco, and coca. A provisional contract has been made for the purchase from Messrs. A. R. Hinde and Co., of the Canooth Estate, situated about twenty-one miles from Tellicherry. It consists of over 900 acres, including thirty-five acres on which successful experiments of the above products have been conducted. The purchase consideration is £4,000, of which £2,500 is payable in cash, and £1,500 in fully paid shares. It is calculated by the directors that rhea will leave a net profit of at least £5 to £7 per acre.

***

The harvest statistics of 1885, issued by Mons. B. Estienne, on the crops of the world, are given below. One hundred is taken as representing an average, and the figures for the corresponding period of previous years are also given for comparison:—

Years.	Wheat.	Barley.	Oats.	Potatoes.	Beans.	Peas.	Roots.	Grass Hay.	Clover Hay.
1881 ...	90·0	110·0	89·6	98·9	...	...	80·0	65·0	65·0
1882 ...	92·2	95·4	105·1	96·4	103·1	101·6	107·1	112·6	118·4
1883 ...	91·8	94·0	100·8	120·6	98·7	1 7·8	102·4	98·1	108·4
1884 ...	112·2	98·1	94·3	108·4	88·2	91·4	78·8	79·1	82·4
1885 ...	101·4	99·2	93·5	92·7	84·7	81·8	80·6	99·1	100·4

***

The blue-book recently issued, containing the report of the Registrar General for Ireland, contains useful information regarding Irish agricultural statistics. It appears that the area of land in Ireland under crops in 1884, compared with 1883, exhibits a decrease of 63,957 acres, 94,660 acres being in tillage, while there is an increase of 30,703 acres in meadow, and clover. There is an increase of 761 acres under woods and plantations, and of 151,420 acres under grass. There is a decrease of 1,183 acres under fallow, and 90,050 under bog waste, water, &c. The crops in 1884, compared with the previous year, show a total decrease in cereals of 79,072 acres, wheat having decreased by 26,850 acres, oats by 33,469, and barley by 18,230 acres. In green crops there is a total decrease of 8,870 acres, potatoes having decreased by 7,615 acres.

It is said that, owing to the competition of Chinese and Italian silk, the manufacture of mulberry silk in the Burdwan division continues to decline, but on the other hand the demand for tussur silk is steadily increasing. The outturn of this silk in the Beerbhoom district last year was valued at Rs. 96,030, as against Rs. [illegible] in the previous year. The higher classes of native are said to prefer the country-made cloth, owing to its being more durable than that of Manchester, but the poorer classes, with their usual improvidence, nearly all buy the latter, owing to its being somewhat cheaper. The consequence has been that many hereditary weavers have abandoned their calling, and taken to other work. Still some qualities of country cloth hold their own in the market, and it is estimated that at the Howrah *hât*, the chief mart for the cotton goods of Hooghly, Howrah, Midnapore, and parts of Nuddea, the sales of this cloth amount to 18 lakhs of rupees a year.

A local contemporary publishes a paragraph, stating that on the 28th March 1882, when an artesian well at Bahour, in French territory, was being bored for, a bed of lignite was met with, which was followed to a depth of [illegible] metres in the following fortnight. After the necessary investigations had been made, and the required authority obtained, Monsieur François Deloncle commenced regular boring operations in the vicinity with encouraging results. Having completed all necessary preliminary arrangements, he proceeded to Paris, and has formed there a Joint Stock Company for working the mines. He expects to return to Pondicherry this month, and to commence active operations in October. Estimates and working drawings for shaftings, buildings, roads, &c., are in readiness for an immediate prosecution of the work, and several superior and subordinate officials have been engaged, and are on the spot, or at Pondicherry. The promoters of the company have proved by three separate analyses the value of the material found at Bahour and its suitability for steam purposes.

***

The Bhagulpore correspondent of the *Statesman*, writing under date the 2nd instant, says:—

I am glad to tell you that Mr. S. Sakhawat Hossein, the Agricultural Officer for this division, is making great progress in his work. I hear he has constructed a number of silos in different parts of the division, and has introduced the improved "duplex" plough in two or three places.—I understand that the manager of the Bareilly estate is about to start a "Demonstration Farm," identical to the Doomraon one in all respects except in size: the Doomraon farm is 10 acres in area, and this farm will be one of 100 acres.—Another young zemindar, Baboo Gour Chundra Roy, has agreed to place a plot of 40 bighas of land under the management of Mr. Hossein, to be cultivated according to the improved method.

It is gratifying to receive such testimony to the efforts being made by officers of the Bengal Agricultural Department to diffuse agricultural knowledge among the people. Mr. S. Hossein is going the right way to work, and there is little doubt that he will succeed in doing much good in the district to which he has been posted. We have not yet heard what Mr. A. C. Sen is doing. It would be for the public good if the Director of Agriculture were to publish a monthly summary of the work done by the several officers under him.

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It has been decided to undertake the compilation of a "Special Manual of the Wynaad," and Mr. A. E. C. Stuart, Special Assistant Collector, Nilgiris and Malabar, has been entrusted with the task, for which abundant material has been got together. On this point, Mr. Stuart, in his report to Government, says:—"The materials for a manual of the Wynaad are rapidly increasing, and a vast number of original documents, which have probably never before been brought to the notice of Government, have been collected since the institution of the janmam inquiry. These documents comprise old records, both in English and Malayalam, unearthed from among the archives of various public offices, and numerous cadjans, copper plates, and writings on bamboo in Malayalam produced by various claimants. The principal facts relating to the amsams which the janmam inquiry has been completed have been set forth in the various reports, &c., already submitted, and the whole are being gradually collected and arranged with a view to their ultimate publication in accordance with the instructions of the permanent Director of Revenue Settlement and Agriculture." That a compilation of the kind under reference is necessary, is evident from the fact that the district "Manual of the Nilgiris," written by Mr. Grigg, does not treat of Nilgiri-Wynaad, which was only constituted an integral part of the Nilgiri district in 1877. The district "Manual of Malabar" is still unpublished; and as south-east Wynaad no longer forms part of the Malabar district, that tract will not fall within the scope of the Malabar manual.

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It may be safely predicted that a manual of the Wynaad will be of much interest, for to quote Mr. Stuart :—"The Wynaad taluk is an exceptional tract not only from its geographical position and past history (which has yet to be written, and the full materials &c. which are only now being collected, and which will doubtless be largely added to in the course of the janmam inquiry and new revenue settlement), but is important as containing the most valuable teak forests in India, and as being the seat of the principal planting operations in the presidency. Immense amount of capital has been sunk, not only in coffee, cinchona, and other special products (notably cardamoms, pepper and, very recently, fibres), but in gold-mining speculations which, however, have not yet been successful. The materials therefore for a special 'Manual of the Wynaad' which would form, as it were, a connecting link between the manuals of the Nilgiri and Malabar districts, are abundant; and if the final results of the janmam inquiry and revenue settlement were embodied in some such collection of facts, which would also contain an epitome of the principal facts of historical, political, scientific, and commercial importance, which must otherwise remain scattered in various official reports, &c., the work would, I believe, serve (to some extent at least) the interests of public utility." We are glad to see that the task of compilation has been allotted to Mr. Stuart, who is an officer of much promise, and one who takes a real interest in his work.

⁂

It has been decided by Government to distribute prizes, aggregating Rs. 19,750, at the several horse-shows and fairs to be held in Northern India during the present financial year. We note the following among the principal places on the list where fairs and shows are to be held, and the amount to be expended at each place :—

Batesar, Rs. 600; Jellalabad, Rs. 700; Allgurh, Rs. 1,000; Boolundshuhur, Rs. 1,250; Saharunpore, Rs. 1,000; Dehra Ghazi Khan, Rs. 2,000; Mozuffergurh, Rs. 1,000; Mooltan, Rs. 2,000: Jhung, Rs. 750; Navchandi (Meerut), Rs. 1,500; Gujrat Rs. 1,200; Shahpore, Rs. 1,000; Lahore, Rs. 1,000; Rawul Pindee Rs. 2,000; Hurdwar, Rs. 600; and Umritsur, Rs. 500.

It appears to us that it would have been more expedient (and would certainly have attracted better specimens of cattle), to have held a smaller number of fairs but of larger pretensions, and to have given larger sums of money in prizes. There is no doubt that the system of offering prizes has had good results; but it seems a pity that money should be simply frittered away in giving insignificant prizes for indifferent specimens of live-stock, when the offer of more substantial prizes, by holding out better inducements to breeders and exhibitors, would have resulted in the exhibition of better specimens.

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Forestry says that "the sunflower artichoke is being extensively cultivated in Belgium, as by a new process of distillation some 8 per cent of alcohol can be obtained from its tubers. More than 3,500 acres of poor, almost waste land, around Antwerp will this year be cropped with the plant. The residue after distillation is nutritious. France is thus also in the way of cultivating large stretches of her poor, thin, chalky, and schistose soils with this new crop. The cultivation of Jerusalem artichoke is very much the same as that for potatoes. February or March is the time to plant; the earlier, the better will be the yield. Indeed if the soil be sufficiently friable, the planting may be made even in water. Owing to the quantity of its foliage, the Jerusalem artichoke draws a great deal of its food from the atmosphere. Artichokes are now being cultivated alike in Iowa and Arizona as a material for fattening pork. In field culture they are not hard to eradicate, and must be replanted at least once in two years. An Iowa farmer finds one or two acres sufficient for quite a large herd of hogs." In India this really nutritious vegetable is so common, and so easily cultivated, that it is surprising why it is not more extensively grown.

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The full returns of the indigo crop for last year show it to have amounted to 1,66,507 maunds, of which 19,668 maunds came from Bengal, 62,038 maunds from Behar, 25,141 maunds from Benares, and 59,660 maunds from the Doab. Upwards of 68,000 maunds from these two latter districts were of native production. The brokers estimate the Bengal crop for next season at 19,800 maunds, which is only a trifle more than last year. Manufacture from the first cuttings has been finished in Behar, and the result is estimated to be about 41,000 maunds, which is more favourable than was at one time anticipated. Khoontee Mahai is now commencing in most parts of Behar, though some factories will not begin for another week. Heavy rain in the absence of sun has done a good deal of damage to the koontee crop, which is still very backward in many parts, and, owing to the lateness of the season, is not likely to yield as much as last year. The accounts from Benares and the Doab are still unfavourable, as more heavy rain has fallen, and it is estimated that the outturn from these districts will not exceed 55,000 maunds, which is much less than last season.

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It is very necessary that owners and breeders of cattle and horses should be able to ascertain, by the pulse, whether their animals are in health or otherwise; upon this subject, we take the following hints from the *National Live Stock Journal* :—

The healthy pulse in the adult horse is from 36 to 40 beats in the minute, in the ox from 45 to 50, in the sheep from 70 to 80, and in the pig about the same as the sheep. In young animals the pulsations are faster, and in old ones they are, slower than those in their prime. In very young ones they are of course, very much faster. The healthy pulsations may also vary in the same class of animals according to breed, temperament, or even individual peculiarities, and a very slight cause, such as a sharp word or a "start" may increase the beats in an excitable horse 10 or 12 beats per minute. The frequency of the pulsations may be taken anywhere that an artery can be felt, by light pressure on it with the finger, or the beatings of the heart may be felt on the left side, just back of the elbow. But were our knowledge as to the state of the pulse to be limited merely to the frequency of the beats, it would be small indeed. The tone, volume, and force, have also to be taken into consideration. A very frequent pulse often indicates great weakness. The pulse in the horse, ox, and in most of the lower animals, is most conveniently felt at the angle of the under jaw, where the submaxillary artery coming from the inside, passes under the lower edge of the jaw-bone, and mounts up towards the face, just in front of the large flat muscle that closes the jaws. The frequency of the pulsations varies so much in different animals, according to the disease, its stage, its severity, etc., that a detailed statement as to its beats would be too long and would be of little service to the reader. We will merely say that few horses will survive long with a continuous pulse of 100. A continuous pulse of 60 to 65 in abdominal disease, lingering colic, etc., would indicate danger, and a pulse of 60 to 70 is not uncommon in favorable cases of influenza, or other lingering or debilitating diseases of the organs of respiration of the horse.

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The following is a summary of Messrs. Wm. Jas. & Hy. Thompson's fortnightly circular of Indian Tea, dated London, 13th August, 1885 :—"The auctions during the fortnight have comprised 23,000 packages, including 3,900 from Ceylon, and 300 packages of reprinted and second-hand teas. Importers have shown a general disposition to realise rapidly, and with this in view some have resorted to sales without reserve. An improvement has taken place in the tone of the market, but competition has not been strong enough to do more than harden prices. The trade, however, hold reduced stocks, and as soon as larger supplies of good qualities come forward, business is likely to be very brisk, judging from the prices paid for some fine Assam teas in to-day's sale. Quotations for low and medium grades are now fully on a par with prices at the same time last season; but the rates recently obtainable for teas classed as 'fine' have been disappointing to importers; and it is evident that the probable effect of low stocks has been over-estimated, and that insufficient allowance was made for the power of the dealers to keep out of the market when it suits them to do so. The latest samples seen from most parts of Assam give promise of a really good crop, and a general improvement is noticeable in musters from Darjeeling and adjacent districts. In Cachar and Sylhet growths, there is much variation, and only a few invoices giving complete satisfaction have so far been seen. The shipments from 1st May to 31st July were 9¾ million lbs, compared with 7½ million lbs to same date last season. At last week's sale in Calcutta about 12,000 packages were offered: prices are reported to have declined, the average obtained being 9½ annas against 9¾ annas and 10¼ annas at the sales of 30th and 23rd July. Ceylon Teas maintain their character and sell readily, the average price standing at 1s. 3d. per lb. The new Kaisows having arrived, it is possible to form a fair estimate of the China crop and of its influence upon the value of the Indian. Opinions differ about the *Kaisows*, but the general impression is that they are barely of average quality, while the Monings are distinctly inferior. The supplies will, therefore, be mostly of low grades, and the effect upon Indian, broadly speaking, will be to keep down the price of inferior teas of all makes, and to enlarge the demand for fine liquoring qualities, irrespective of leaf. The shipments from China are heavier than they were last season, and the visible supply of Tea is only from 9 to 10 million lbs. less than last year, although on 1st August the stock was 20 million lbs. lighter. The deliveries were again small in July, but the daily duty payments are beginning to increase somewhat, a sign that the trade is coming to the end of the surplus stocks cleared in the spring. The exports to the Continent, &c.—which mainly affect the China market—are below last season.

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We have before us the results of the trials made with the Manilla plantain hemp and the wild plantain stalks by the Glenrock Company, Pandalur. As might have been expected, the experiment has virtually proved a financial failure. Our readers may judge for themselves by a perusal of the following extracts, which we quote from the papers placed at our disposal. Mr. Minchin, the manager of the Glenrock Company, in his report, says:—

> A trial in the treatment of Manilla plantain hemp was made here in the Death and Ellwood machines, belonging to the Company, on 31st January last. Mr. Guard sent from Captain Cox's Naiken Shola estate well grown Manilla plantain stems obtained from Manilla hemp stock received from Mr. Ballard, Collector of Malabar, in 1863-64, and since growing on that estate. One hundred and seventy-nine large stems were delivered at the mill, which weighed 10,073 lbs., or about 60 lbs. each stem, and after passing these through the Death and Ellwood machines, there was produced 159 lbs. of clean fibre, say 1·49 per cent of the green stuff. The cost of treating this fibre, drying, sorting, and preparing for market, was Rs. 4-3-0, or at the rate of Rs. 63 8 0 per ton of clean fibre, valued in London at £28 per ton at present depressed rates. There is 90 per cent of water in the green plaintain stalks; of the remaining dry vegetable matter, we saved 15 per cent of good fibre.
>
> In the Philippine Islands the cost of preparing the fibre is calculated at one-half the value realized on the coast, and the people employed at this work are paid accordingly, an expert hand being able to prepare about 12 lbs. of fibre per day; and the average produce is one pound of fibre from each stem said to average [illegible] pounds in weight.
>
> Wild plantain stalks have also been treated here at this Company's mills; some being sent to England with the Manilla plantain fibre from Naiken Shola estate for valuation and comparison. The stalks of the wild plantain are not so large and well grown as those of the Manilla plantain, very few attaining to 50 lbs. in weight: but there seemed little difference in the strength or appearance of the two fibres.
>
> I find the Rhea fibre most worthy of consideration, and hope to have [illegible] acres under this cultivation shortly.

The Acting Director of Revenue Settlement and Agriculture, Madras, in reviewing the result, says:—

> The account of the experiment, though interesting, contains no details of the number of the plants carried on an acre of ground, or of the number of cuttings which can annually be made, or of the cost of carriage of the raw material from the place where it was grown to that where it was prepared, or of the charges connected with the carriage, &c., of the fibre to England.
>
> The valuation of the Manilla fibre is given at not more than £10 per ton, say Rs. 125. The cost of treating, drying, sorting, and preparing it for the market was, at the place of manufacture alone, Rs. 63 8 0 per ton, or rather more than half the value of the fibre in the English market. When other charges come to be deducted, there would be, if any margin of profit, but a very small one indeed.
>
> Although the stems used for the experiments were evidently of considerable age, the plantation from which they were obtained having been put down so far back as 1863-4, the outturn of fibre, as compared with the stems used, was not quite 1½ per cent, and this is described by the experts who examined it as containing a very considerable proportion of exceedingly indifferent stuff, so poor as to render the price per ton of the whole far below that mentioned by Mr. Minchin. The wild plantain fibre was still worse.
>
> It seems clear that unless much improvement, both in the method and cost of preparation of this fibre, can be made, cultivation of it cannot possibly be made remunerative.
>
> A copy of the report of Messrs. Collyer and Co. on the fibres transmitted to them by the Glenrock Company is enclosed.

The following reports by Messrs. Collyer and Co. speak for themselves:—

> *Wild Plantain.*—Very mixed and irregular, mostly very weak, a strong portion fairly strong, a good deal being flaggy refuse, with scarcely any fibre in it. When the fibre is fairly strong, it is fairly well cleaned, but apparently a good deal is intrinsically too poor to bear cleaning efficiently. The proportion of stronger fibre may be too small to be worth separating, otherwise it would appear desirable to ship that portion only in future, and then it might realize £15 per ton and upwards, mixed as it is. The bulk is too poor for use alone, and for mixing purposes, it will only realize very low prices, say £7 or £8 per ton.
>
> *Manilla Plantain* from Captain Cox's Naiken Shola Estate.—A somewhat similar fibre to above, with a larger proportion of strong, a small part being good, useful, clear fibre of good color, somewhat approaching ordinary Manilla hemp; but the great bulk is poor, weak, flaggy stuff; the same remarks as to cleaning apply. Where the fibre is sufficiently bold and strong, result is satisfactory; on the whole, unless the stronger fibre can be kept separate, the price must be very low, say about £10 per ton; the best alone should be worth £25 upwards.

ENSILAGE *vs* GREEN FODDER.

II.

We have been unable to take up this subject earlier, owing to other pressing matters requiring attention. In our last article under this heading, we expressed our conviction that ensiled fodder, when properly prepared, was superior to fodder in its green state, so far as its nutritive qualities were concerned. In support of our view, we quoted the testimony of General Wilkinson, as bearing most directly upon the question under discussion, which arose out of our dissent from the views expressed by Mr. D. B. Allen, of the Bengal Agricultural Department, as to the value of ensilage. Mr. Allen addressed a letter to us which appeared in our issue of 22nd ultimo, in which he questioned the accuracy of the results obtained by General Wilkinson, alleging as his reason that no weights were given by the General, nor the quantities of grass and ensilage upon which the cows were fed; and to further strengthen his argument, he quoted a letter, dated 28th May 1885, addressed by that gallant officer to the Government (which we regret we have not seen), in which he is said to hav written as follows :—" With this universal (but variable) daily decrease of yield, it has been found impossible to tabulate the advantage gained by the use of ensilage, for increasing the yield of milk." In fact, that General Wilkinson himself had some doubts about the accuracy of his own statements !

Now, without going any further, we have again glanced over General Wilkinson's report ; and we can hardly believe that he deliberately mis-stated facts in order to demonstrate the superiority of silage over green grass. In all ages, innovations and inventions have had supporters and opponents ; but when it [illegible] taken into consideration that the system of ensilage is, and [illegible] at the time General Wilkinson reported the result of his trials, in the experimental stage, it can hardly be said that he was carried away by his enthusiasm for the new system to give such a colouring to his results as to actually misrepresent facts and figures. Admitting for a moment that he omitted to note certain minor points, which Mr. Allen thinks entirely vitiate these experiments, the main fact remains unaltered, *viz.*, that certain cows fed respectively on silaged and green fodder, showed an increase of yield and in richness of milk when fed on the former. We are not disposed to discredit General Wilkinson's statements. Should these lines be read by him, he will no doubt take an early opportunity of setting us right.

With regard to the opinions of scientific gentlemen in Europe and America on the value of ensilage, it [illegible] be well to make a few prefatory remarks before venturing on the subject. In India it seems to have been generally understood that any sort of receptacle will serve the purposes of a silo. Nothing could be more erroneous. We are favoured, from time to time, with reports of experiments in ensilaging fodder in various parts of the country. They are, without exception, not of much value, and we have frequently had occasion to point out the *bald* and worthless character of these reports. The results of such experiments prove *nothing.* They are wanting in every item of detail upon which a correct and reliable opinion could be formed. Not one of the so-called experiments have fulfilled the necessary *conditions.* The *idea* seems to have been misunderstood, and *there* is an amount of ignorance prevalent as to the *nature* of ensilage, that positively staggers us. As an instance, we may mention that unused limekilns, old 'blind' *kutcha* wells, and the like have been used as silos, from which satisfactory results have actually been expected ! As a rule, experiments have been conducted in a most perfunctory manner, without any regard to details, no care being taken to note the temperature, or other important items necessary to demonstrate the value or otherwise of the system. It appears to have been thought sufficient to state the size, cost and nature of the silos used, the weight and variety of fodder silaged, and whether cattle ate it freely or not on the silos being opened. On one occasion the writer (Deputy Commissioner, Amherst District) in his report, said : "I find that two silos were made in October 1884," and then proceeded with the stereotyped description on hearsay evidence, not having actually seen the silos. We have disgressed from the subject-matter of this paper, but we have done so to point out how impossible it is to arrive at a strictly accurate estimate of the relative value of silage and green fodder in this country under the present slip-shod methods of conducting such experiments.

To return to the point. The evidence taken by the Royal Ensilage Commission is conflicting. Some scientific men maintained the superiority of ensilage over ordinary fodder, while others were of a different opinion. It would be tedious to quote at length, but by following the evidence closely, we find that the consensus of opinion is on the side of silage. Professor Sheldon, in a paper on "Sweet Ensilage," published in the *North British Agriculturist*, and in which he reviews Mr. Fry's valuable work on this subject, writes as follows :—

> Many would-be reformers are carried off their feet by enthusiasm that is wanting more or less in discretion ; but this is not the case with Mr. Fry, who may be regarded as the original pioneer in the domain of sweet ensilage in this country, and his book is the boiled-down result of much study and experiment. Mr. Fry regards the question as beset with difficulties, which can only be met by intelligent attention to details, which are constantly varying, and he declares he has 'neither seen nor heard of a silo which perfectly fulfils the necessary conditions' ; he also declares that even if such a silo were in existence, it would not be 'possible to ensure results always good alike.' This is, of course, obvious when we reflect that the result depends on the quality of the grass or other raw material used for the purpose, on the amount of moisture it contains, on the degree of maturity at which it has arrived when it is cut, on the peculiarities of its growth and structure, on the weather at the time, and on other conditions which provide plenty of scope 'for the exercise of ability and judgment.'

The foregoing passage needs no comment. Further on, the Professor says :

> Mr. Fry is more cautious than some writers have been on this topic, when he says that the silo does not render the ensilor absolutely independent of weather and other circumstances ; and in giving this timely warning to farmers who may haply have been carried away by what they have read elsewhere, he is not only doing the best service to ensilage as a system, but is lessening the volume and risk of cruel disappointment. At the same time, the difficulties spoken of may be overcome by 'careful and intelligent attention, and success is within reach of every man who will take the necessary pains. These points are definitely laid down, *viz.* (1) A perfect silo must be air-tight, water-tight, and 'heat-tight.' (2) The forage put into the silo must not contain more than 75 per cent of moisture. (3) The temperature of the silage must rise above 122 Fahr., or it will be sour. These points are clear enough, but they require the exercise of care and judgment. To a man whose mind has seized the principles of the system, there is no more difficulty, all things considered, than in hay-making ; but even in hay making, we see a great deal of non-success, which is the result not of bad weather only, but also of carelessness and an ignorance on the part of farmers, in so apparently simple a process.'

The necessary requirements of a proper silo are, according to Professor Sheldon, as follows :—

> A silo must have even and perpendicular sides, in order that the weighted covering may follow the silage closely as it sinks. The form of it, however, may be round, instead of square or oblong, but in any case the inner surface must be smooth, straight, and perpendicular. Stone or brick walls are plastered with cement ; concrete walls, may, perhaps, be made to do without a plastering of cement, and in this event they are probably the best walls that can be used for a silo. It is obvious that the walls, whatever material they may be built of, must be strong enough to resist any pressure that may come against them from the inside ; this pressure, however, is not very considerable. There is no need for a 'drain or other outlet for moisture at the bottom' of the silo. If a doorway is left in the wall for convenience of emptying the silo, it should be made perfectly air-tight before the silage is put in. This may be done without much difficulty, providing the door is well made and strong, the frame-work properly constructed and the packing even and sufficient. Perhaps the best way is to break up the doorway when the silo is empty, plastering it inside with cement, like the rest of the inner surface of the silo. The roof of the silo must be high enough above the square to admit of having the ensilage trodden evenly around by the walls and close up to them.

It will thus be seen that it is not every hole dug in the ground that will answer the purposes of a silo. The Professor winds up his paper in the following terms :—

> The temperature at from 4 to 6 feet fom the surface should reach at least 122° Fahr. in two or three days after filling. Even if it reach 140 to 160° so much the better ; if it do not reach the desired height, this may be regarded as proof either that the stuff is too wet or that the filling and compression have been going on too quickly. As there is no fear that spontaneous combustion will ensue, the temperature may be ascertained closely enough by the aid of an iron rod, simply thrusting it down into the mass and trying its heat by hand when it is withdrawn. Ordinary British crops do not need chaffing for a silo, but they should be evenly spread in it, and well trodden down, specially near the walls.
>
> Our author, who has produced a valuable book, advises farmers to try ensilage at first on a small scale, until they have learnt to make it properly ; then they may extend the system as much or as little as they think proper. The crops ensiled should be of good quality, and in a proper state of maturity, for young, succulent, placid herbage will produce silage of a quality unsuited for the production of good milk. The system of ensilage adds one more resource to the farmer, but it is not calculated to supersede either hay-making or root-growing in any very marked degree. It is obvious that while hay must contain only some 15

> per cent of moisture, and silage may contain 75 per cent, the crop preserved is more easily digestible in the one case than in the other, and silage may be made when hay would be spoilt by the weather. It is easy enough to make good hay in fine weather, and silage can be made when it would hardly be considered fine, though, as it would seem, wet weather is suitable for neither process, though less so for hay-making than for ensilage.

In the *North British Agriculturist* of 22nd July 1885, we find the following remark :—

> An experiment with ensilage against hay and roots shows that five cows, receiving ensilage only, consumed 349lbs. per day, at a cost of 5s. per week. The same number consumed 400lbs. of roots and 8lbs. of hay daily, at a cost of 7s. 9d. per week. In thirty-seven weeks a balance of £25 8s. 9d. appeared in favour of ensilage, and the quality of the milk was good.

Turning now to America, we find the following in a leading article in a recent number of the *Farmers' Review*, one of the most ably conducted agricultural journals we have seen :—

> It is claimed that fermentation is desirable for the reason that all green food taken into the stomach of the animal shortly becomes sour, and that the souring in the silo is really the first stage of digestion, but performed before it enters the stomach of the animal, instead of after its introduction; certain it is that animals feed upon this sour silage with a relish, and it has proved a most valuable food whether for milk, beef, or simply a sustaining ration, as the testimony of hundreds of intelligent farmers in this country, Great Britain, and on the continent of Europe proves. Under this system of producing sour silage, the method has been to fill the silo as rapidly as possible, usually cutting the material fine with a cutting machine, tramping as closely as possible while filling, covering with boards and weighting at the rate of from 100 to 200 pounds per square foot with stones, boxes of sand, or other heavy material; or applying an equivalent pressure by lever or screw force. Within the last two years a new theory of ensilage has been developed, which promises, as we think, to supersede the old theory and practice. It is this: that the germs of fermentation are destroyed by a heat of 122° degrees Fahr. And that these once being destroyed and the air excluded, no further fermentation or change will take place in the mass, and the result is sweet instead of sour silage. To develope the requisite degree of heat to destroy the germs of fermentation, slow filling in place of rapid filling is adopted. Two or three feet in depth is filled in, spread evenly over the bottom and allowed to heat up till the requisite temperature (above 122° degrees) is developed, when another layer is put on and left to heat up, and so on, until the silo is full, or the material all in. The heating of each layer destroys the germs of fermentation in it. The addition of the next layer excludes the air from it, so that no more germs can be added to it, and the temperature gradually subsides. As each addition becomes heated up, the fibrous material becomes softened, and each addition made above acts as a weight to closely compress it, so that when the filling is completed, at the end of two weeks or more, it has become so solidly compressed that but little weight is needed on the top.

It is the first process of digestion which takes place in a silo; hence the superiority of silage over fodder in a green state. It loses but an infinitesimal portion of its solid feeding qualities by this change. But it follows that good, wholesome food, which can be easily digested and assimilated, must be superior to food not possessing this quality, notwithstanding that the latter may contain somewhat more solid feeding-matter. It is the chemical change that takes place in a silo that enhances the value of silage.

We agree with Mr. Allen that the superiority of ensilage has not yet been *entirely* proved. As we have said, the system is yet in its experimental stage, and it will be years before it can be so proved. The broad fact, however, remains that, in the great majority of cases the experiments with ensilage (when properly conducted) have demonstrated its superiority over ordinary green fodder.

With reference to the concluding words of Mr. Allen's letter of 10th August, "that as long as certain butchers and dairymen in England object to receive the produce of cattle fed on ensilage," &c, we note he has omitted to state that it was only in the case of cattle fed on garbage and vegetable refuse of the most abominable kind which had been ensiled, and of which "certain dairymen and butchers came to hear," that they refused to accept "produce of cattle fed on ensilage."

MUNICIPAL FARMS.

We have been favoured with a mass of correspondence between the Government of Bengal and the Municipal Commissioners of Howrah, on the question of the disposal of the night-soil of the Municipality. We cannot possibly publish the correspondence, but the letter, dated the 30th June, from Mr. Forbes Mitchell, Municipal Commissioner, to the Chairman of the Municipality on the subject of a Municipal Farm, seems to us to be valuable. We can make but a few extracts from the remainder of the correspondence. We note then that the Magistrate of Howrah, in a letter to the Commissioner of the Burdwan division, alluding to a former report from Mr. Forbes Mitchell, on the Bantra night-soil trenching ground or depot, writes as follows :—

> The inspection report of Mr. W. Forbes Mitchell is especially valuable, and brings clearly to light the real causes of the difficulty. The depot, if the trenching ground deserves the name, is much too small for existing requirements, and the result is that the conservancy department of the Municipality is forced, for want of space, to return to used-up land, and to re-open old trenches much too soon. Mr. Mitchell notes this fact very emphatically.

The authorities thus clearly see that the whole difficulty as to the disposal of the night-soil arises from the want of space, and unless the Government is prepared to assist the poorer municipalities by grants or loans, the present system of wasteful and dangerous nuisances, misnamed night-soil depots, or municipal trenching grounds, must continue. We see from the annual report of the Municipality of Howrah, that the municipal authorities have to provide for the disposal of 60 tons of night-soil daily, which, by the present system, is not only wasted, but converted into an offensive and dangerous nuisance. Now Mr. Forbes Mitchell's scheme means that one ton of this night-soil manure is ample for manuring 30 square yards of land per annum to grow the most exhausting class of crops. The whole quantity would therefore suffice *for richly manuring a farm of 650,000 square yards, or 135 acres of land* per annum. A successful Municipal farm means both health and wealth to the Municipality; but to initiate it, a large outlay is required, much larger than the Municipal income can afford, and unless the Government comes forward with funds, either as a grant or a loan, the scheme must fall through, and the people of Howrah and Seebpore continue exposed to disease and death in their midst, from causes such as are described in the following extract from a letter by Mr. O'Donnell, the Magistrate of Howrah :—

> I observed that the trenches in process of being charged with night-soil were shallow for the purpose, and far too much filled with it. The fœcal matter was poured in a semi-fluid state into the trenches, to the depth of six to eight inches, and then reached to within the same distance from the surface of the ground. It seems to me that no soil could absorb and assimilate such a quantity of excreted matter except in a period measured by years. The shallowness of the trenches in use was explained on my viewing the trenches just being re-opened for the reception of night-soil a few days hence. I found Mr. Forbes Mitchell's strictures on their condition more than established. The trenching mehters told me they could not dig deep or stand in the trenches whilst digging, on account of the underlying abomination which one of the men showed me was still soft and unabsorbed by the surrounding earth. The smell from these trenches was very bad, and after months of decomposition, the gases rising from their contents must be mephitic in a very high degree. How far the influence of these odours reaches, I cannot say, nor what effect they have on public health round. I am fearful of using language which might be hereafter described as exaggerated, but I must say that I cannot imagine, and have never experienced a more noisome stench arising from fœcal matter.

We have here an official description of what exists at our doors, and we beg our readers to note that it is not the Municipal Commissioners who are responsible for this condition of things *but the Government of Bengal*, under whose administration it was established, and who are morally bound to find the funds for reform. Reverting to Mr. Forbes Mitchell's scheme for a Municipal farm, about 550 to 600 acres of land would be required, which the Municipality would have to acquire under the "Land Acquisition Act." For properly and profitably working such a farm, it would be necessary to lay it out in a regular system of fields separated by accommodating roads, either semi *pucca* for the light cart traffic of the farm, or by the system of light tramways, and each field thoroughly fenced with barbed steel wire fences, which are light, strong, and durable, and do not occupy too much ground. After laying out each fence and road, the whole ought to be lined with fruit trees of superior quality, mango, lichee, guava, jack, cocoanut, &c. &c., with plots of the best plantains—all of which would be most remunerative, and require but little cultivation after the first cost, and if the plants were carefully propagated by an intelligent *malli*, even the first cost would be small. This scheme of Municipal farms will, we hope, command the attention of Government and of the Municipal authorities.

The Bantra people have certainly been very long-suffering and patient under a condition of things almost incredible, when we remember that it has existed within sight of Calcutta. The Lieutenant-Governor deserves our acknowledgment for the response made by him to the remonstrances which have appeared in the public newspapers upon the subject, but Mr. Ware Edgar might, we think, have assumed a different tone towards the Municipality from that which pervades the final paragraph of the letter of 6th June, to the Commissioner of Burdwan on the subject. It is admitted that the neglect which has so long marked the administration of the township has been that of the Government itself, and that the Municipality simply inherits the present condition of things from its civilian predecessors. Surely, then, the tone which characterises the following paragraph might have been somewhat different:—

The Lieutenant-Governor is aware that the present Municipal Commissioners of Howrah are not entirely responsible for the objectionable state of things at Bantra. Its origin dates from a period anterior to the present condition of the Municipality. It rests with them, however, to remedy the evil; and appeals to Government are useless, &c. &c.

The Municipality is in no way answerable for a state of things which prevails all over Bengal, and would have prevailed till doomsday, but for the resolution of the Supreme Government, that its intensely centralized system of rule shall give place to the government of the people by themselves. It is not the Howrah township alone that wants the very elements of Municipal administration. It is the same everywhere, and will remain the same while the Government attempts the impossible task it has set itself, and the curtailment of which it is so disposed to resent. It will be time enough to speak of the responsibilities of the nascent municipalities of the province, ten years hence, when they have been fairly put upon their trial, and failed. One would really imagine from the tone in which the Government addresses these new-born institutions, that they were loaded with the sins of years, and had grown hoary in neglect and iniquity. What we see all over Bengal to-day, is a total and almost incredible want of local rule of any kind, through the determination of the Government to engross all powers in its own hands. In pointing out to the people the very task that lies before them of making up for past neglect, we might have expected that the Government which is chargeable with this neglect, would have expressed some generous regret at the nature of the inheritance they are bequeathing the people. The attitude of the Secretariat reminds us of that of the dying spendthrift who, having wasted his son's estate, calls him to his bedside, only to reproach him with the fact that he has made its redemption nearly hopeless, and dies with a malediction on his lips, for the broken fortunes and wasted estate to which it is his misfortune to be heir.

MODELS OF INDIAN AGRICULTURAL IMPLEMENTS AT THE LONDON EXHIBITION.

The following Circular Memorandum, dated 15th May 1885, has been issued by the Government of India, Revenue and Agricultural Department, to all Local Governments and Administrations:—

The Agricultural Court of the London Exhibition should contain a set of typical agricultural implements and machines or models thereof from each province.

After correspondence with the Directors of the Agricultural Departments in all provinces, it has been determined that models of large machines should be one-fourth of the full size, and that small implements should be shown full size. The decision whether in individual cases the former or the latter scale should be employed, is left to the discretion of the provincial authorities, subject to the suggestion that all hand implements, such as bill-hooks, saws, &c., should be sent full size.

The main object of the collection is that English manufacturers should be made aware of the character of the agricultural machines and implements used in India. For this purpose it is not necessary that specimens of every kind of implement or machine used in each province should be shown. This is especially the case where large and heavy implements, such as ploughs, harrows, and the like, are concerned, of which one model of the kind of plough, harrow, &c., most commonly used is thought to be sufficient. Varieties may be described by diagram or letter press.

It is more desirable that a complete set of small implements, such as saws, small and large, or tools commonly used by carpenters and blacksmiths for cutting wood and other work, which requires the tool to have a strong steel edge, should be sent to the Exhibition, as it is not unlikely that English manufacturers will succeed best in finding a market for this class of implements. Care should at any rate be taken not to omit any implement of the kind which is largely used in any part of the province. It is suggested also that an implement which has been in use will be preferred to a new one made for exhibition.

The collection should be accompanied by a list, of which 500 copies may be printed. In order to ensure some uniformity, a specimen form is appended, the general size and arrangement of which should be followed. The type used is somewhat large, as it may be found convenient in some cases to paste cuttings from the list on the specimens, and should therefore be easily read.

It has been suggested that each implement, machine, or model should have firmly attached to it by wire a label such as is used by gardeners on which the name of the province and the number on the list, the name of the implement, and a statement that the model is of full or ¼ size, should be written in indelible ink. As it is intended that the collection should remain permanently in London after the close of the Exhibition, it is necessary that measures be taken to prevent any chance of the identity of the exhibit being lost. The label should, therefore, if the above plan is followed, contain the information given in columns 2, 3 and 4 of the form as in the sample appended,* and should bear

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*PUNJAB *List of Implements and Machines.*

No	Name of Machine or Implement		Purpose for which used.	Whether extensively used, in what Districts, and by what class of people.	Particulars as to Manufacture.*	Local Price.
	Vernacular.	English.				
1	2	5	4	6	6	7
						Rs. As. P.
1	Darat or Dach.	Bill-hook.	Lopping branches and cutting down brush wood.	Extensively used by the villagers of the Western Himalayas.	Made by every village blacksmith in the hills; of native iron, not seldom with a steel edge [illegible] hard wood [illegible] used for [illegible] handle.	0 [illegible] 0 to 2 0 0 N. B.—Th[illegible] [illegible] the [illegible] of [illegible]

* Note.—*E. g.*, place of manufacture, character of wood or metal usually employed, and where materials are usually obtained.

Label suggested.

	PUNJAB.		Full size.	
1	Darat or Dach	Bill-hook	Used for lopping branches and cutting down brush-wood.	

conspicuously the name of the province from which the implement is forwarded. The question as to the best form of permanent label will be subsequently decided, and further instructions on this point may be therefore awaited.

As the collections are intended to be of permanent advantage to the Agricultural Department, it is hoped that funds may be provided for them from provincial sources. It is impossible, to allot any portion of the Bombay loan grant for the purpose, and the limited funds at the disposal of this department will make it difficult to provide any sufficient sum for the preparation of anything like a complete collection. All charges for carriage will, however, be paid by the Imperial Government. Early information is requested whether sufficient funds will be forthcoming for the purpose.

In addition to a set of purely agricultural machines and models, it is proposed to supply models of some of the machines used in trades connected with agriculture, such as oil presses, silk winders, cotton looms, &c. Funds for this purpose will be supplied by the Government of India.

A list of the latter class of machines of which it may be suggested that models should be constructed, should be forwarded to the Exhibition office at Calcutta at a very early date with a rough estimate of cost. The models should ordinarily be one-fourth of the full size. In some cases it will be desirable to have clay or wooden figures of the labourers or cattle employed to work the machines. But questions of this kind will be determined in direct correspondence with the Exhibition Branch of the Revenue and Agricultural Department, which is immediately responsible for the preparation of the collection referred to in this paragraph, although it is hoped that every reasonable assistance will be given in the matter by the provincial authorities.

If the officer to whom this circular is addressed is not the officer in charge of the Agricultural Department of the province, it is suggested that he should place himself in communication with that officer for such instructions or advice as may be required in connection with these collections.

Miscellaneous Items.

The Mysore Excise Department is busy collecting information regarding the local manufacture of beer, with the view of bringing the said manufacture under the same supervision and regulations as arrack.

A correspondent, writing from the province of Shansi, says the increase in the cultivation of opium this year is very striking. The former Governor of the province, Chan Chih-tung, vigorously repressed the growth of opium, crowding it back into secluded fields, but this year the farmers make no attempt at concealment, and the poppy flourishes apace.

More wails have reached Bombay against the Forest Department, this time from Satara and Sindh. The Forest Commission will doubtless hear all and sundry of the aggrieved. It will be a fresh consolation to the latter to know that H. E. the Viceroy watches over their affairs with special care, because they are so especially poor and unrepresented.

The partial destruction of the rice crops in China, consequent upon the recent floods, continues to attract large supplies of Burmah rice to China. The Chinese have chartered the S.S. *Scindia*, a vessel of respectable dimensions, for the transport of this cereal from Rangoon to Canton. Reports of a deficiency in Rangoon has stimulated large exports from Bangkok also.

In connection with the Lucknow Exhibition of Arts and Manufactures to be held in November next, to which we drew attention in a recent issue, it might be advisable for the Local Committee to entertain the services of Mr. Pat. Doyle, C.E., as this is a department in which that gentleman would prove useful. Mr. Doyle would lay himself out energetically in furtherance of plans for ensuring the success of the Exhibition.

Colonels Prendergast and Hasted, R.E., Irrigation Department, and the District Engineer of South Arcot, arrived in Pondicherry recently, for the purpose of holding a conference with the French Government officials regarding certain irrigation works of importance, to both the French and British Governments.

The total cost of the administration of the small French Indian Colony of Yanon for the current year of 1885 is 47,575 francs, equal to Rs. 23,094, or fully 25 per cent less than the pay and allowances of a single collector in British territory. The amount includes (1) chief administration charges, 4,391 francs; (2) public instruction 10,531 francs; (3) Judicial and Police, 10,682 francs; and (4) Medical service 6,614 francs; the balance being for Public Works, &c.

The order of Mons. F. C. Regel, the Governor of the Dutch Settlements on the Coromandel Coast, dated 15th March 1819, and addressed to the inhabitants of Sadras and Meyur, has lately been produced on an enquiry made as to the taxes on certain [illegible] or back-yards in Sadras and Meyur. It recognises the [illegible] as tax-free *inams* to be held in perpetuity, and the Government of Madras has decided to confirm these *inams* as tax-free grants in perpetuity.

Arrangements have been made by the Survey Department for carrying out the survey work necessitated by the re-settlement of three districts of the Chuttisgurh division—Raipore, Sumbulpore, and Belaspore—the last of which is to have a full cadastral survey, with record of rights on the North-West Provinces system. Three full field parties will thus be employed, one being brought from Malwa, another from Burmah, and the third from the Revenue Survey which has been going on at Ajmere.

The *Japan Herald* states that the almost unprecedented quantity of rain which fell in Japan during the month of June has been the cause of widespread disaster, a large tract of country in the neighbourhood of Osaka having been inundated. No reliable estimate has yet been made either as to the number of lives lost or as to the extent of the damage. A high official estimated on Saturday, 27th June, that the number of bodies recovered was one thousand, but the number of lost is now roughly placed at fifteen thousand. The damage done was put at $10,000,000, but now one would hardly care to suggest any sum that would cover the total loss of property.

The lighthouse tender *Ceylon* has left Colombo for Minicoy, taking as passenger Mr. Rossett, the German scientist and explorer, who hopes to be able to collect a mass of information and objects such as were never before brought before the public. Mr. Rossett will be the first European who has made any thing like a complete exploration of the Maldive atolls. He takes introductory letters to the Sultan and his Prime Minister, Ibrahim Didi, and, should he be successful, the Ceylon Court at the Exhibition will gain by the addition of a portion of his collection. The *Ceylon* will land him at the Male atoll, the most northern and approachable island, and nearest to Minicoy. Thence he will make his way southwards in native craft, passing from one atoll to the other. The *Times of Ceylon* remarks that as he is conversant with the Arabic language and is provided with ample means, and is moreover most courteous and agreeable in his manners, he will experience no difficulty in his labour of love, for such it is to him, though engaged in the services of others. He hopes to be back in Ceylon in about three months from the present time.

It would appear that the natives are awakening to the necessity of making some provision against the disasters of a future famine. The last dearth appears to have taught them that it is not wise to depend wholly on Government aid which in nine cases out of ten is misdirected, for we hear that a movement is on foot to organise in all outlying villages in the Mysore province funds to be utilised in relieving the needy during a famine. The fund to be raised will not consist of money alone, but grain also will be received as gifts towards it, and stowed away in granaries to be built for the purpose. Raggy will probably be the grain required, as it is the only one, as far as we are aware, that will keep for years, if kept dry, without deteriorating. It is estimated that twenty lakhs of rupees could be collected within a few years by receiving small money doles from natives. The grain will be given away to ryots and others together with a seer of raggy in return for work done by them, such as deepening of tanks, &c. This is the merest outline of the scheme, but it is proposed to ask some leading native gentlemen to convene a meeting for the purpose at which details will be arranged. The proposal is a benevolent one, and as such must commend itself to natives in general, and we wish the movement success.

Selections.

SUGAR-CANE AND SUGAR TRADE IN BRITISH BURMAH.

[*Concluded from last week.*]

Memorandum by Mr. J. E. Bridges, Director of Agriculture,—dated the 12th August, 1885.

22. *Modes of cultivation.*—Where new land is cleared, land already cultivated has been left fallow, the cultivator turns up the soil with a hoe at the beginning of the rains (May or June); he then leaves the soil to rest until September when he digs holes about [illegible] inches deep and one foot wide at intervals of 1½ foot from each other. Three pieces of cane (agyaung), about five inches long, are then placed in a standing position in each of these holes, so that one end of each plant touches the ground and the other protrudes about an inch over the top of the hole. The cane-pieces are then partly covered up with loosened earth. There are generally three joints to each of the cane-pieces and each joint has one eye. Many of the young shoots being, however, destroyed by the heat or other accidental causes, it is seldom that more than five or six canes are found to one stool.

23. Some cultivators plough their land three times at the beginning of the rains instead of turning it up with the hoe; but the more general practice is simply to run deep furrows through the land in September, and then place the cane-pieces longitudinally at the bottom of the breach, which is about ten inches deep and 1½ foot wide. The space left between the furrows varies from two to three feet, according to the nature of the soil.

24. Before the cane is planted, the land is cleared of grass and weeds. About 10 days after the cane-pieces have been planted, the earth is loosened in the intervals between the holes, and the cane-pieces further covered up with mould. In the month of Pyatho (beginning of January) the earth is again loosened, and the plants further covered up. About the month of Kazon (May) the land is again cleared of weeds and grass, and the plants are then left until the month of Wagaung or Tawthalin (August and September), when they are stripped of the leaves that have become old and withered.

25. After the second year's crop the land is either left fallow for a year, or again replanted with cane-tops and then left fallow the following year. Some portion of each plantation, except in very small holdings, is left fallow every year, as only enough cane is cut daily to supply the amount of juice required for boiling, and part of the land is still uncropped in Pyatho (beginning of January) when the sun is too hot to allow of cane-tops being planted. In land thus left uncultivated the cultivator often plants paddy for his food provision, after leaving sufficient space between the rows of paddy to put down cane-pieces in September.

The cane generally cultivated for manufacturing purposes is so flexible that it does not require any support; the canes are not therefore tied in clusters in these plantations in the manner described for plantations on the tidal creeks.

26. This is the system of cultivation followed in the Shwegyin district, and the modes of cultivation adopted in the other districts differ but little from it.

27. *Area of plantations.*—The area of plantations in most districts is seldom over an acre; in the Shwegyin district, however, the area of the holdings is much larger; they measure three to four acres, and sometimes as much as 25 acres.

28. *Irrigation.*—Irrigation is seldom resorted to in the districts where cane is grown for manufacturing purposes. In exceptionally dry seasons the plants are sometimes watered in February.

29. *Rat-ooning.*—There are generally three or four young shoots, or ratoons, which spring up from the old stool. Where those ratoons are sufficiently thick, no new plants are put down after the cane has been cut, but as a rule cane-tops (kyanbya) are planted (pha saik thi) in the intervals between the ratoons (kyaung-ot) after the land has been cleared of grass and weeds: these cane-tops are about five inches long and are planted from November to the beginning of January, when cane-pieces can no longer be planted. The cultivators state that one ta (0·28 acre) yields to 3,500 cane-tops, whereas one ta of cane yields enough cane-pieces to plant out five tas (1·40 acres). Canes sell at Rs. 20 per 1,000, whereas cane-tops sell at Rs. 2 per 1,000.

In Sandoway as many as three crops are obtained from the paungkyan, but the last crop is said to be very inferior, stunted, and contains but little saccharine matter. Two crops are sometimes obtained from the kyaunt. In Mergui it is stated that the cane is only planted once every three years.

30. *Harvesting.*—In Burmah proper the canes bloom about the month of November; they are then severed with a dah from the stool close to the ground. The branches at the top are given to the cattle for food, and the top, which is cut off where the hard cane ends, preserved for planting. The canes are then divided with the dah into two pieces of about four feet each, tied up in bundles and carried by the cane-cutters to the mill, where they are bruised, and the juice extracted.

In Arakan the canes do not generally ripen until December, and the cane cutting does not begin until January.

31. *The Sugar Mill.*—The mill in general use in Burmah proper consists of two heavy upright cylinders of about one foot in length and two feet in diameter. The cogs are circular and are cut in two rollers superposed to the crushing cylinders. A shaft, about 12 feet long, is fixed at one of the upper cylinders, and is turned by a buffalo yoked to it.

32. A few improved machines are now used in Bilin; and they consist of three upright pyingado cylinders, and the middle cylinder to which the shaft is attached, turns the other two by means of short, straight, wooden cogs: these machines have been made by a Burman, Maung San Dwa, who imitated an English machine he had seen in Moulmein. The price of the machine with two cylinders is about Rs. 50, and of that with three cylinders about Rs. 70.

33. In Arakan a mill of a much rougher description is used as its cost is given as only Rs. 5 in Sandoway, and in Kyaukpyu the til-seed mill (pestle and mortar arrangement) is in general use. In Mergui it appears that a stone-crushing press is used.

34. *Crushing.*—The canes, which have been previously cut short, are passed three times between the wooden rollers, being handed back by a labourer, who collects them as they come out of the machine. The cane juice is received in a large bamboo frame, and thence flows through a bamboo gutter into an iron pan in the boiling shed.

35. The crushed cane (cane-trash, or megass) is dried in the sun for two days, and then used as fuel with branches of trees and dead wood brought from the neighbouring jungle.

36. *Boiling.*—The juice is carried in earthen pots from the receiving pan to the iron boiling pans, which are placed three in a row over a furnace dug in the ground. The fire is kindled at one end of the furnace and boils all the pans in succession on its way to the chimney. The liquor is at first placed in the pan furthest from the fire, and as it evaporates it is passed on by means of ladles to the next pan and from this to the pan immediately over the fire. It gets thicker as it passes along, and the impurities are removed by means of a wooden skimmer. In each pan is placed a bamboo framework to prevent the boiling juice from escaping over the sides of the pan. After the juice in the third pan has become sufficiently thick, it is taken off the fire and poured into an iron pan, where it is allowed to cool for a few minutes. It is then poured on a bamboo mat, spread evenly with a piece of bone, and then divided with a piece of pointed bamboo into small squares. After it has become hard, it is broken into cakes and packed away in bamboo baskets covered with leaves. Each basket contains about 175lbs. of jaggery.

Cost of Cultivation.—The cost of the different kinds of labour hired for cane-cultivation is as follows:—

	Per ta (0·28 acre.) R.	A.	P.
Ploughing	2	0	0
Clearing	1	12	0
Digging holes for plants	[illegible]	0	0
Planting	1	8	0
Loosening earth	2	0	0
Loosening earth (second time)	2	0	0
Clearing (second time)	2	[illegible]	0
Pruning	2	0	0
Cutting canes*	4	0	0
Seed	5	0	0
Total ...	25	4	0

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* Two labourers are hired for cutting canes for each mill used; they are paid Rs. 15 each for mensem, without food, and they cut about one acre of cane a month, one-half of their hire being put down to cost of cultivation and one-half cost of manufacture; this would give about Rs 4 as the cost of cutting canes per ta.

This hire includes the cost of keeping the labourers, which is by custom estimated at eight annas a man per ta.

38. The cost of cultivation in a plantation worked entirely with hired labour would, therefore, amount to about Rs. 90 per acre. The greater number of cultivators, however, hire little or no labour and work the land with their families. Those who work very large holdings generally hire their labourers by the year, and not by contract. The average cost of cultivation per acre may be estimated at Rs. 15 to Rs. 20.

39. The instruments used in cultivation, with their cost, are as follows :—

	Rs.	A.	P.
The plough, or ta	3	0	0
The curved hoe (dagauk)...	1	0	0
The straight hoe (pauktu)	1	0	0
The da for cutting canes...	0	8	0

40. *Cost of Manufacture.*—The cost per mensem of the labour employed in the manufacture of kyantaga (gur) is as follows :—

	Rs.
Two men cutting canes † at Rs. 5 each ...	10
Two buffaloes at Rs. 7 each	14
One herdsman	7
One labourer to boil the juice	20
Food of labourers	15
Total ...	66

41. The monthly outturn for one furnace is generally taken as 1,250 viss of jaggery, and if the outturn per acre is taken as 1,000 viss, this would give us the cost of manufacture per acre Rs. 53 (52·80). To this amount must be added the annual wear-and-tear of machinery, the cost of fuel, baskets, mats, &c., and the annual erection of crushing and boiling sheds.

42. The crushing machine costs Rs. 50, and it is stated to last about seven years ; it works about three months annually, and takes one month to crush the cane of one acre. It, moreover, requires annual repairs, which amount to Rs. 3 or Rs. 4. The annual wear-and-tear for the machine would, therefore, be about Rs. 3·50 per acre. The boiling pans cost about Rs. 21, and are said to last about three years ; as one set is used for each mill, the annual wear-and-tear per acre for boiling pans would be Rs. 2·30. Allowing Rs. 11·20 per acre for the share of other expenses, the cost of manufacture would amount to Rs. 60 per acre.

43. The labourers who cut the canes also pass them through the mill. The herdsman not only grazes the buffaloes, but drive them whilst turning the mill and carries away the cane trash to dry. The labourer who boils the juice also breaks the jaggery into cakes and packs the cakes away in bamboo baskets.

44. Although the hire of these labourers is always given by the month, they in reality work by contract. The headman has to boil daily seven *kyaws* (iron can containing 90·12 gallons of juice, yielding from 150 to 196 lbs. of jaggery, (according to the season), the labourers cutting the canes have to supply and pass through the mill a sufficient number of canes to yield seven *kyaws* full of juice. If the full monthly outturn is not obtained, the pay of the labourers is reduced in proportion to the deficiency. Some headmen make 10 *kyaws* of kyantaga a day, their pay then rises to Rs 25 per mensem, and another cane-cutter and buffalo have to be hired.

45. *Yield per acre.*—The following table shows yield per acre according to the experiments made by District Officers:—

		Number of canes per acre.	Weight of canes per acre. lbs.
Arakan ...	Akyab	...	...
	Kyaukphyu	...	...
	Sandoway (estimate)	5,000	36,500
Pegu ...	Pegu (northern portion)	3,000	(estimate) ...
	Tharrawaddy	...	...
	Prome	...	...
Irrawaddy	Henzada	...	...
	Thayetmyo	...	...
Tenasserim	Amherst	...	...
	Shwegyin	10,809	37,377
	Toonghoo	...	...
	Tavoy	...	...
	Mergui (estimate)	7,500	...

The following shows the yield per acre in juice and kyantaga (gur) :—

		Amount of juice per acre. lbs.	Weight of kyantaga per acre. lbs.
Arakan ...	Akyab	...	...
	Kyaukpyu	...	...
	Sandoway	...	2,482
Pegu ...	Pegu	...	...
	Tharrawaddy	...	...
	Prome	...	...
Irrawaddy ...	Henzada	...	...
	Thayetmyo	...	...
Tenasserim	Amherst	15,622	2,759
	Shwegyin	22,566	3,452
	Toungoo	...	...
	Tavoy	...	...
	Mergui	10,950	2,566

46. *Selling price of jaggery.*—The selling price of jaggery at the beginning of the season varies from Rs. 35 to 30 per 100 viss ; later in the season the price falls to Rs. 25 and 20 ; and for two years it is said to have fallen as low as Rs. 9 per 100 viss. The cultivators generally agree in taking Rs. 25 per 100 viss as the average price, and this price may be taken as a fair average.

47. *Average profits.*—In holdings worked entirely with hired labour the cost of cultivation amounts to Rs. 90, and the cost of manufacture to Rs. 60 per acre. The average outturn per acre (3,500lbs. at Rs. 25 per 878lbs.) is worth Rs. 250 ; the net profit per acre, not including cost of living, would therefore be Rs. 100. In small holdings the cost of cultivation has been estimated at Rs. 20 per acre, and the cost of manufacture being Rs. 60, the net profit would amount to Rs. 170 per acre. In small holdings which do not measure more than one acre, the cultivator spends all the profits in supporting himself and his family, and in the larger holdings the profits of cultivation often go to pay the interest on money borrowed.

48. *Condition of the cane-cultivators.*—The cultivators are everywhere the manufacturers, but in most districts they only cultivate small areas of cane and also grow paddy. No information regarding the condition of these cultivators is available, and it does not probably differ much from that of the general body of cultivators. In Shwegyin, however, where the cultivators grow exclusively sugar-cane, it has been found that more than half of them are in the hands of Burmese and Chinese money-lenders, who advance them money at the rate of 48 or 60 per cent, and also compel them to sell their kyantaga in advance at 30 or 40 per cent below the market value, so that the rate of interest in reality amounts to 100 or 150 per cent.

49. *Local consumption and import.*—Taking the total area under cane in the permanent tract to be 7,000 acres, the average outturn at 2,800lbs. of gur per acre, the amount of sugar produced in one year would be 8,750 tons ; the whole of this is consumed in British Burmah, excepting small quantities exported from the Akyab district into Chittagong.

The import of sugar into British Burmah during the last five years has been as follows :—

	Foreign ports. Cwts.	Indian ports. Cwts.	Upper Burmah.* Cwts.
1880-81	47,636	16,008	187,551
1881-82	48,575	37,894	199,577
1882-83	37,600	36,835	231,782
1883-84	23,751	40,216	202,808
1884-85	38,310	44,772	298,285

Refined sugar is consumed only by Europeans and Burman traders in the large towns, and the imports of this kind amounted last year to 78,869 cwts.

50. *Direction in which improvements may be effected.*—Attempts have been made to improve the cultivation, especially in the Shwegyin division, by introducing new kinds of cane. Canes from Northern India and from Penang were imported, but none of the North India canes, and only a few Penang canes, are thriving at Billu, and the supply of them was so small that they have only been used for seed stock, and none of them have as yet been crushed.

51. Cane stock from the Billu valley was introduced into the Salween district by Government, and a small cane farm maintained at Papun for the purpose of distributing cane stock. A large number of cane-tops and cane-pieces were distributed, and it is believed that cane-cultivation has now obtained a firm footing in that district. The canes grown there were 8 feet long and about 7 inches thick, and the kyantaga manufactured from their juice was said to be better than that of Billu, and sold at Rs. 45 per 100 viss.

An attempt will be made to introduce cane-cultivation into the Arakan Hill Tracts during the coming season.

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† One-half of this has been put down to cost of cultivation.

* This sugar from Upper Burmah is made from palm-tree sap.

52. Four of Messrs. Thompson and Mylne's mills were sent to Bilin in 1882. The cultivators tried them for some time and did not continue to use them, as they objected to the small size of the cylinders and to the shortness of the shaft. They asked for mills with hollow cylinders of a diameter of 1½ foot and a length of one foot, as they thought this would increase the speed of the mill without any additional strain on the cattle.

It was not possible to comply with the request of the cultivators until Mr. Mylne had personally ascertained the validity of their objections. Mr. Mylne visited Bilin at the beginning of this year, and after examining the Shan mill in ordinary [illegible], he considered that the Shan mill was the best Native [illegible] he had seen in any part of India, and he attributed [illegible] riority of the Shan [illegible] machinery to the ex[illegible] to make the mill (phylngado or iron [illegible] and to the draught-power of Burmese cattle, which [illegible] a large-sized mill. He then proposed to have made in [illegible] a double-squeeze mill of a larger size than any hitherto sent out to India, and have it tried at Bilin at the end of the year.

53. Mr. Mylne was of opinion that the Shans have little to be taught in the art of planting cane, and that their mode of cultivation was superior to that generally adopted in India. He pointed out, however, that many of the canes in the plantations were laid on the ground, and they would yield a more acid juice than straight canes. He illustrated this by testing the density of the juice of three straight canes, which was found to be nine according to Beaume's saccharometer, whereas the juice of bent or laid canes only gave 7½. The Shans admitted that the juice of some of the laid canes was so acid that it could not be manufactured into kyantaga; but they appeared to think that it would be too troublesome a task to tie the canes of one stool together so as to prevent them from falling.

54. Mr. Mylne considered that the Shan method of preparing and boiling the juice was defective, as the wickerwork frame used in boiling, the receiver, conductor, and receiving-pan are not kept free from the germs of fermentation, and the juice is consequently somewhat acid before it is boiled. He added that the juice is always more or less burnt in the Burmese pans, and, therefore, produces a smaller quantity of crystallizable sugar. He recommended the Shans to uncover the juice conductor, which is usually a hollow bamboo buried in the ground, and showed them how to destroy the germs of fermentation in the different implements used by fumigating them with sulphur.

55. Mr. Mylne was accompanied by a native of Behar, who showed the Shans and Burmans the improved methods of boiling the juice in a shallow pan after clarifying it with a decoction of the rind of the root of the *Abelmoschus esculentus* (lady's-fingers) and of the crushed seed of the *Ricinus communis* (castor-oil plant). Three boilings were made of—

(*a*) gur (not clarified) with juice from Burman mill evaporated in Behea pan;

(*b*) kyantaga (not clarified) with juice from the Burman mill evaporated—(*a*) in Burmese pan, (*b*) in Behar pan;

(*c*) rab (not clarified) with juice from the Behea mill evaporated in Behea pan.

56. The jaggery thus made was afterwards analyzed with the following results:—

	Kyantaga, Burmese gur, evaporated in their pan; juice from Burmese mill.	Kyantaga, evaporated in Behea pan; juice from Burmese mill.	Gur obtained [illegible] boiling; juice from Burmese mill.	* Dry rab made by Maung San Dwa, Burmese mill.	Dry rab, cane-juice [illegible] by Behea mill and evaporated in Behea pan.	[illegible] No. 5.
	No. 1	No. 2.	No. 3.	No. 4	No. 5	No. 6.
Crystallizable sugar ..	60·65	68·69	60·01	62·09	78·33	45·31
Uncrystallizable sugar ..	10·75	9·43	10	6·5	1·07	9·60
Water	7·	6·	7·	[illegible]	7·	29·
Ash	·51	·9	·6	·31	·61	·9
Soluble organic matter ..	20·59	14·60	21·70	[illegible]	10·74	14·02
Insoluble organic matter ..	·5	·38	·69	1·4	·25	·18
	100·00	100·00	100·00	100·00	100·00	100·00
Net sugar [illegible] ..	45·23	56·56	47·4	54·97	73·83	39·[illegible]

* No. 4 is the rab obtained by a Burman trader in his attempt to make refined sugar. This is noticed in the next paragraph.

Sample No. 6, termed "molasses," is, as will be seen from the above figures, much better than it is named. It contains a lot of crystallizable sugar freely separating out, and when freed from its moisture by drying at 100° C., becomes a fairly good "rab."

57. Mr. Mylne makes the following remarks on this analysis:—

"Taking No. 1 (Bilin kyantaga) as a basis of comparison, No. 2 shows a gain of 8 per cent in crystallizable sugar; this is obtained by evaporating the cane juice in the flat, open pan with a very much larger area of evaporating surface in proportion to bulk, as combined with the small, round, deep pans at present used there. No. 3 shows a loss of 0·64 per cent in crystallizable sugar, consequent, we believe, on its being from the first trial of the open pan at Bilin and before the pan had been properly cleaned by use.

"No. 4 shows a gain of only 1·44 per cent after all the expense incurred on it by Maung San Dwa.

"No 5 shows a gain of 17·68 per cent, due entirely to the care with which the cane-juice was kept from contact with germs of fermentation, this being effected by—

"(i) crushing the cane between iron rollers;

"(ii) receiving the juice in a fumigated, portable receiver, and

"(iii) transferring it at once to the shallow pan, where it was further clarified by a cold infusion of the rind of the root and stem of *Abelmoschus esculentus* (lady's-fingers), or in Hindi "ramtural," and also by a cold infusion of the bruised seeds of the castor plant.

"No. 6. This is the molasses drained from No. 5, and shows that there was 45·31 per cent of crystallizable sugar remaining in it, with rather less uncrystallizable sugar than No. 1.

"The last line of figures gives the net crystallizable sugar in each sample. It is evident that No. 6 (the molasses of No. 5) could be made into a fairly good gur or kyantaga.

"No. 5 is a very clean, pure sugar, and till a good crystallizing rab can be produced it might suit Maung San Dwa to make this kind of sugar [illegible] to break it down into what is known here as 'bhura.'

"We doubt if a good rab, such as D, can be produced from the loose, light loam of the Bilin valley. Here we get it from a good, clay, loamy soil. There are extensive areas of this kind of land in Burmah on a slightly higher level than the stiff clay lands."

58. It is not possible to say whether the cane-cultivators will follow the improved methods of manufacture shown to them. The shallow Behea pan was left with them, and next season will show whether they consider it advisable to adopt it.

59. Several attempts have been made at Bilin by Burmans and Chinese to manufacture refined sugar, but hitherto without much success. The last attempt was made in 1884 by a Burman [illegible] tor, named Maung San Dwa, according to a method probably of Chinese origin. He bought large quantities of kyantaga (gur), and after boiling it again, placed the thick syrup thus obtained in [illegible] cal earthenware pots. The sugar gradually granulated and the molasses was drained off from the bottom of the jars. The sugar then left in the jars was whitened by covering it with a layer of earth mixed with honey and herbs; the sugar was removed as it whitened and the layer of earth applied to the lower sugar until the whole contents of the jars had been treated in this manner. He was, however, unable to utilize the molasses drained off, and the sugar he obtained was very coarse and dark in colour, so that he was only able to sell it for about Rs. 45 per 100 viss, and lost a considerable amount of money in this experiment.

60. Mr. Mylne visited Maung San Dwa's refinery. He attributes this failure to the want of proper appliances, and to the method adopted in boiling the juice. Mr. Mylne did not advise the establishment of a refinery at Bilin, but the introduction of a [illegible] now in use in India. He offered to show Burmese cultivators the methods of manufacturing in India. This offer has been accepted, and Maung San Dwa and a Shan cultivator will proceed to India next year at the expense of the local Government to study improved methods of sugar manufacture.

61. Advances have been made by Government to the cultivators of the Bilin and Thebyu valleys, who were found in a state of chronic indebtedness. In 1883 about Rs. 7,000 were advanced to the cultivators and fully recovered in the following year. In 1884 Rs 20,000 were again advanced, but a sum of about Rs 7,000 has not been recovered owing to a low yield of sugar, due to heavy floods and to a fall of about 30 per cent in the price of kyantaga. A further sum of Rs 30,000 has been advanced during the present year, and it is hoped that the whole amount, with the arrears of 1884 will be recovered during the next season. It is believed that the result of these advances has already been a slight reduction in the rates of interest and the improvement of the condition of the cultivators. Such an experiment will have, however, to be continued for several years, if it is expected to have any lasting results, and it is as yet early to judge of the success of the experiment.

THE CULTIVATION OF TOBACCO IN IRELAND.

In an article on this subject in the *National Review* Mr. R. Staples says, that upon the revolt of the American colonies, for the double purpose of punishing the Virginia planters and trying to win the affections of the Irish, the Government of Lord North made it lawful to grow and cure tobacco in Ireland. In this condition things remained during the eighteen years of Irish independence, and the permission to grow tobacco in Ireland was still expressly continued by the Articles of Union. By an Act, however, of 1 and 2 William IV, the Act of Lord North was repealed, and from that day a fine of 100*l*. is imposable on any person growing more than one pound of tobacco in his garden. There can be no question that in certain districts, where the soil was suitable, large profits were earned. The county of Wexford, and the neighbourhood of Enniscorthy in particular, was the most favoured spot in this respect. As a proof of this the records of the debates in Parliament are sufficient and we have also other authority to the same effect. In the *Dublin Penny Journal*, December 1832, there is to be found an article bearing on this subject. In relating the account of an interview with a tobacco farmer from county Wexford, the writer gives some interesting information as to the value that could be extracted from Irish soil, by the growth of the now forbidden plant. A young man from Enniscorthy had been over to Maryland, and on his return brought with him some seed and encouraged his brother to venture on it, and from half an acre 100*l*. had once been produced. Holding a farm of sixteen acres, this man made a profit of 1,200*l*. in seven years. The tobacco sold well, because it was Irish, and the prohibitory Act lately passed, was viewed with much disfavour and dismay. What has once been might be again, and it is surprising that for so long a time the Irish farmer has been content to remain under a restriction apparently so unfair, and opposed to all the tendencies of modern legislation. It is frequently asserted that the climate is unsuited to tobacco, and that it cannot be profitably cultivated, but in face of the weight of evidence existing to show that a profit used to be obtained from its growth, the objection cannot be considered of much value. In any case the abolition of an artificial restriction would soon prove the truth or fallacy of this assertion, for, if it cannot be produced at a profit to compete with foreign tobacco on equal terms, tobacco, like wheat, would again cease to be cultivated. The farmer would soon prove to be the best judge of the profit or loss derived from the transaction. One objection, no doubt, is that it is an exhausting crop to the soil; but the same objection, only in a lesser degree, applies to flax, which has been for many years past the mainstay of industry in Ulster. And, as tobacco can now be cured by steam, the influence of the weather on the process of curing is of less importance than formerly. The climate and soil appear to be as well adapted to it as they are to the potato, which was introduced at the same time, and from the same source. Some short time since an interesting paper on the subject of cultivation of tobacco was read in Dublin by Mr. T. A. Walker, at a meeting of the Statistical and Social Inquiry Society of Ireland. The writer of that paper, who like many others is fully alive to the necessity of finding some new employment for the unoccupied agricultural population had taken the trouble to communicate with several gentlemen both in England and America, who are intimately acquainted with the conditions necessary to the successful growth and curing of the plant. According to the testimony [illegible] statute acre should produce two and a [illegible] tobacco, and if after paying all expenses the [illegible] only realise a profit of 2*d*. per pound, it would amount to [illegible] per acre. Another estimate placed the profit to [illegible] at not upwards of £25 per acre, but all accounts agree that a good and substantial profit would be realised. In France the [illegible] cultivating a hectare of land, nearly two acres, [illegible] stated by M. Joubert (Tobacco) to be about [illegible] and the average produce to be £86 5*s*., leaving £51 3*s*. [illegible] profit to the French farmer, while even more can be made in successful seasons. The collection of the excise duties in France is not surrounded with any special difficulties, and it is not easy to see [illegible] should be otherwise in Ireland. In the [illegible] there is any special return, the imports [illegible] into Ireland amounted to [illegible] manufactured tobacco alone, and mainly for the use of the poorer classes and exclusive of cigars, which are a luxury for the rich [illegible]

THE HAOMA PLANT OF THE PARSEES.

(TO THE EDITOR OF THE "TIMES OF INDIA.")

SIR,—With reference to a paragraph in your issue of the 27th instant, on the soma plant, I think the following extract from a letter of Dr. Aitchison will be interesting to some of your readers, especially to the Parsees. The letter is dated 25th June 1885, Tarbut Shikh Jam, Persian territory. On learning that this eminent naturalist was engaged in making inquiries about the soma plant, in the flora of the mountain regions of Afghanistan, I sent him a short description of the *haoma* (*soma*) plant as found in the Avesta books of the Parsees, together with a few twigs of the plant used by the Parsees of Bombay. These twigs were specially sent for from Persia by Mr. Ardeshir Sorabjee Dustoor, the energetic secretary of the Persian Zoroastrian Amelioration Fund. The learned naturalist writes:—

"The specimens you sent me are the twigs of a species of *Ephedra* nat. order *Gnetaceæ*.

"A species grows all over this country, Beluchistan, Afghanistan, Cashmere and Western Thibet which seems to be identified with the species received.

"The species is here in all this country called *Hum* (pronounced as the English word *whom*), also huma.

In Beluchistan it is, as well as a totally distinct plant, *Periploca aphylla*, called *Hum*. It grows equally on exposed hills and valleys, one mass of upright twigs, each twig, if you notice, being made up of joints like the joints of the fingers. The bush (from 1 to 2 feet) is golden coloured, and the twigs are more or less so. This plant has no leaves. It is all twigs and jointed.

"Amongst the Pathans of the Khyber Pass and all over that country the twigs are with water made into a decoction, and employed very largely as a household remedy in sickness, and are considered as possessing health-giving and healing properties.

"Owing to a general likeness of the stiff rod-like growth, upright and erect, of the two plants, in Beluchistan, the natives equally give both the same name.

"No one would mistake the jointed and true *Hum* for the non-jointed false *Hum*, *Periploca*. The latter does not exist here at all.

"The [illegible] here is [illegible] by the people to mix with snuff, being first of all burnt. The ashes cause the snuff to be more irritating, whether [illegible] to the upper gum under the [illegible] part of the lip, as is the habit here."—Yours, &c.,

JIVANJI JAMSHEDJI MODI.

[illegible], August 29, 1885.

COLONISATION IN INDIA.

Before long we shall probably see an extensive emigration of the cultivating classes from the crowded districts of these Provinces to the new lands of the Punjab, or perhaps to the sparsely-populated countries of Rajputana and Central India. All experience of the process of colonisation will therefore be extremely useful to Government, for a little experience will help the authorities to avoid mistakes and blunders which might check and seriously injure one of the most important and desirable of the economical movements of the day. In the last Report written by Sir Henry Ramsay on Kumaon, a few words are said about colonisation, and they would seem to indicate in a simple manner the policy which must direct the establishment of new villages on new lands. Sir Henry writes —"As a rule, I allow a new village to have the land free for two years, that the settlers may clear the jungle, build their huts, and get the land into order. The third year four annas a bigha is charged, next year six annas, and then eight annas." And no doubt with these concessions and under Sir Henry's fostering care colonisation went on apace. But something more than revenue concessions will be wanted at first, and leaders to conduct the emigrants will be necessary. The young colony must be kept together, and must have some headman to look to for guidance; and whether this headman be an agent of Government or a man of authority from the parent village, the success or failure of the movement will almost entirely depend on him. It is the fashion to say now-a-days that the village community is breaking up, and that the tendency of the times is towards a severalty of interests. We cannot controvert this, but we do maintain that in the colonisation of new lands on a large scale the village community will play a prominent part, and that the communal system will take a new lease of life, and it would be a mistake to look for independent action on the part of the emigrants, or to ignore the sentiment of joint dependence, which is the product of ages. The colonisation of new land will be a movement of the greatest interest, and may lead to results as yet undreamt of by the natives of India. When once the plunge has been taken, and the old district changed for a new one, there will be little hesitation in going further afield, and a mobile population will seek new provinces, and perhaps new continents. With a few *bhain-bunds* and buffaloes, the sturdy cultivator of Northern India will make any land his home.

A SKILFUL SURGICAL OPERATION.

THE American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billorth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms :—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "all gone" sensation; a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow; the hands and feet become cold and sticky—a cold perspiration. The sufferer feels tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often-times there is a palpitation of the heart, and the patient fears he may have heart disease. Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomes closed, or nearly so. Although this disease is indeed alarming, sufferers with the above-named symptoms should not feel nervous, for nine hundred and ninety-nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner. The surest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White (Limited), 17, Farringdon road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

St. Mary Street, Peterborough,
November 29th, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr. A. J. White. William Brent.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer described it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Sd.) Vincent A. Wills,
To Mr. A. J. White. Chemist Dentist, Merthyr Tydvil.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

Preston, Sept. 21st, 1883.

My dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully, in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.

I am, dear Sir, yours faithfully,
To A. J. White, Esq. (Signed) W. Bowker.

Spanish Town, Jamaica, West Indies, October 24, 1882.

Dear Sir,—I write to inform you that I have derived great benefit from "Seigel's Syrup." For some years I have suffered from liver complaint, with its many and varied concomitant evils, so that my life was a perpetual misery. Twelve months ago I was induced to try Seigel's Syrup, and although rather sceptical, having tried so many reputed infallible remedies, I determined to give it at least a fair trial. In two or three days I felt considerably better, and now at the end of twelve months (having continued taking it), I am glad to say that I am a different being altogether. It is said of certain pens that they "come as a boon and a blessing to men," and I have no reason to doubt the truthfulness of the statement. I can truly say, however, that Seigel's Syrup has come as a "boon and a blessing" to me. I have recommended it to several fellow-sufferers from this distressing complaint, and their testimony is quite in accordance with my own. Gratitude for the benefit I have derived from the excellent preparation, prompts me to furnish you with this unsolicited testimonial.

I am, dear Sir,
Yours ever gratefully,
(Signed) Carey B. Berry,
A. J. White, Esq. Baptist Missionary.

Hensingham, Whitehaven, October 16, 1882.

Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(C) (Signed) John H. Lightfoot.

Holloway's Pills.—Wrongs made Right.—Every day that any bodily suffering is permitted to continue renders it more certain to become chronic or dangerous. Holloway's purifying, cooling, and strengthening Pills are well adapted for any irregularity of the human body, and should be taken when the stomach is disordered, the liver deranged, the kidneys inactive, the bowels torpid, or the brain muddled. With this medicine every invalid can cure himself, and those who are weak and infirm through imperfect digestion may make themselves strong and stout by Holloway's excellent Pills. A few doses of them usually mitigate the most painful symptoms caused by undigested food, from which they thoroughly free the alimentary canal, and completely restore its natural power and action.

FOR PRICKLY HEAT, CONSTIPATION, HEADACHE, BILIOUSNESS, CHOLERA, FEVERS, &c
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to destroy the ... As possessing elements most essential for the restoration and maintenance of health with perfect vigour of body and mind
... fumigating Tasteless: forming a most Invigorating, Vitalising & Refreshing Beverage.
It is Effervescing ... ACHE, SEA or BILIOUS SICKNESS, CONSTIPATION, INDIGESTION, LASSITUDE, HEARTBURN, and
Gives instant relief in HEAD... cures the worst forms of TYPHUS, SCARLET, JUNGLE, and other FEVERS, SMALLPOX, MEASLES
FEVERISH COLDS; prevents and quickly ... various other altered conditions of the Blood. A valuable PREVENTIVE of DYSENTERY.
and ERUPTIVE or SKIN COMPLAINTS, and ...
Dr. SPARKS (Government Medical Inspector ... from the Port of London) writes:—"I have great pleasure in [illegible]"
Dr. PROUT—[illegible]
Dr. MORGAN—"It furnishes the blood with its lost saline [illegible]"
GOVERNMENT OFFICIALS AND PLANTERS caring for the welfare of their employes should note its value as a specific in Fever Cases.
Dr. J. W. DOWSING—"I used it in the treatment of forty-two cases of Yellow Fever, and am happy to state I never lost a single case."
Dr. W. STEVENS—"Since its introduction the fatal West India fevers are deprived of their terrors."
HER MAJESTY'S REPRESENTATIVE the GOVERNOR of SIERRA LEONE, in a letter of request for an additional supply of the Pyretic Saline, states:—"It is of great value, and I shall rejoice to hear it is in the hands of all Europeans [illegible]"
RAWUL PINDEE, PUNJAUB, INDIA.—"We firmly believe that the use of your Pyretic Saline will do more to prevent fever [illegible] than all the Quinine ever imported [illegible] and family in the worst [illegible]"
Dr. TURLEY—"I found it act as a specific, in my experience [illegible] no other medicine being required."
Dr. S. GIBBON (formerly Physician to the London Hospital)—"Its usefulness in the treatment of disease [illegible] experience."
To be obtained of any Chemist or Drug Store, in Patent Glass-stoppered Bottles, at various prices
Please note in connection with the recently observed effects of the use of Citrate and other preparations of Magnesia that LAMPLOUGH'S PYRETIC SALINE is warranted not to contain Magnesia or any substance which would cause calculous or other earthy deposits.
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Purify the Blood, correct all Disorders of the
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They invigorate and restore to health Debilitated Constitutions, and are invaluable in all Complaints incidental to Females of all Ages.
For Children and the aged they are priceless.
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Is an infallible remedy for Bad Legs, Bad Breasts, Old Wounds, Sores and Ulcers.
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FOR SORE THROATS, BRONCHITIS, COUGHS, COLDS,
Glandular Swellings and all Skin Diseases, it has no rival; and for contracted and stiff joints, it acts like a charm.
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78, NEW OXFORD STREET (late 533, OXFORD STREET), LONDON.
And are sold at 1s. 1½d., 2s. 9d., 4s. 6d., 11s., 22s., and 33s. each Box or Pot, and may be had of all Medicine Vendors throughout the World.
Purchasers should look to the Label on the Pots and Boxes. If the address is not 533, Oxford Street, London, they are spurious.

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THE INDIAN AGRICULTURIST.

A WEEKLY
JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA:—SATURDAY, SEPTEMBER 19, 1885. [No. 38.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 9TH SEPTEMBER 1885.]

General Remarks.—In Madras rain in varying quantities has fallen in all districts, but more is urgently needed in several places, especially in Bellary, Coimbatore, Madura, and Salem. The reports from Bellary are very discouraging. Rain continues to hold off in Mysore; crops are generally reported to be withering, agricultural operations are at a standstill, and the prospects of the dry crops are critical, and entirely dependent on a very early fall of rain. Fodder is becoming scarce, and the migration of cattle from Kolar into British territory is reported. In Coorg prospects continue favourable.

Slight rain has fallen throughout the Bombay Presidency, excepting Sindh; but more is urgently required in several parts of the Deccan and Southern Mahratta country, where fodder is scarce. In parts of Poona, Ahmednugger, Dharwar, Bijapore, and Belgaum the crops are withering for want of rain. They have been injured by floods and insects in parts of Kurrachee, by blight and worms in parts of Hyderabad, and by excessive rain in parts of Surat. In the Berars and Hyderabad, rain is wanted for the standing crops, which are at present doing well. Rain has fallen generally throughout the Central India States, and the crops are doing well. In Manpore, however, rain is much wanted. In the Rajpootana States, rain has been almost general, and prospects are satisfactory.

In the Central Provinces, agricultural prospects continue good; but more rain would be beneficial in Nimar and the southern districts, where the break has been of long duration. In the North-Western Provinces and Oudh, rain has fallen in several districts; but a break has set in to the advantage of the crops, which have already suffered from excessive rain. Prospects are, on the whole, good. Moderate rain has fallen in most parts of the Punjab, and *kharif* prospects are generally good.

In Bengal, rain has fallen in all districts, and a break is now much needed for the crops. Excessive rain and floods have caused considerable damage in parts of Burdwan and the Presidency Divisions, and some injury to the *bhadoi* crops in places in Behar and Chota Nagpore. Seasonable weather prevails in Assam, where agricultural prospects are generally good.

In British Burmah, ploughing and transplanting have been nearly completed.

Cholera continues in the Madras and Bombay Presidencies and in Raipore in the Central Provinces, and in some districts of the North-Western Provinces. Elsewhere the public health is generally fair.

Prices are rising in Bengal and Mysore; in the Punjab they are falling, and elsewhere they are generally steady.

Madras.—General prospects discouraging in Madura, Coimbatore, and Salem, especially so in Bellary. More rain urgently needed in several districts besides these.

Bombay.—Slight rain throughout the Presidency, excepting Sind; more required urgently in several talukas of the Deccan and Southern Mahratta country districts, and in parts of Kaira. Crops withering in parts of Poona, Ahmednugger, Dharwar, Bijapore, and Belgaum, and damaged by floods and insects in parts of Kurrachee, by blight and worms in parts of Hyderabad, and by excessive rain in parts of Surat; fodder scarce in parts of most districts in the Deccan and Southern Mahratta country. Cholera in parts of sixteen, fever in parts of ten, and cattle-disease in parts of eight districts.

Bengal.—Rain in all districts during the week; a break of fine weather is now much needed for all crops in many districts; excessive rain and floods have caused considerable damage in parts of Burdwan and Presidency Divisions, and some injury to *bhadoi* crops in places in Behar and Chota Nagpore; elsewhere prospects of crops are favourable. Price of rice rather higher in several districts. Public health continues generally fair, but fever is appearing in some districts.

N.-W. Provinces and Oudh.—Rain has fallen in some districts; a break has set in to the advantage of crops, which have already suffered from excessive rain. Prospects are, on the whole, good. Markets are well supplied, and prices generally steady. Cholera continues to be reported from a few districts.

Punjab.—Moderate rainfall in most districts. Health and *kharif* prospects generally good. Prices falling in the Hissar and Jullundur districts; stationary elsewhere.

Central Provinces.—Rain wanted in Nimar and in the southern districts, where there has been a long break; elsewhere there has been no deficiency. Prospects continue good.

British Burmah.—Cholera severe in one district, slight in three districts, elsewhere public health good; cattle-disease slight in seven districts, elsewhere health of cattle good. Ploughing and transplanting nearly completed. Rains seasonable.

Assam.—Weather rainy. Fevers prevalent; cattle-disease still reported from some mouzahs. Transplantation of *sali* almost finished; prospects of all crops good. General health good.

Mysore and Coorg.—Rain continues to hold off and crops generally reported to be withering; agricultural operations almost at a standstill; prospects of the dry crops critical, and the future entirely dependent on a very early fall of rain. Drinking-water failing, and fodder for cattle decreasing; leaves being used as fodder in parts of Bangalore, Tumkoor, and Kolar; from the last-named district some ryots are reported to have removed their cattle into British territory. Cattle poor; cattle-disease prevails in parts; cholera and fever in Mysore, but public health generally fair. Prices slowly rising.

Berar and Hyderabad.—Weather cloudy. *Kharif* crops doing well, but require more rain. Wheat 13¾, coarse rice 12¼, white *juari* 18¾, yellow *juari* 22, and *tur* 15¼ seers per current sicca rupee.

Central India States.—Weather clear. Crops thriving. Health generally good.

Rajpootana.—Tanks and wells full. Prospects good; crops on low lands have suffered much from late inundations. Health good. Prices steady. Fine weather.

Nepal.—Prospects good. Cholera ceased.

Letters to the Editor.

CULTIVATION OF THE ORANGE.

TO THE EDITOR.

SIR,—I shall be much obliged if you can give me any hints on the cultivation of orange trees in India. I don't want to know about the climate, because no place is better adopted to growing oranges than the place I have selected. I wish to know what distance apart the trees ought to be planted, when they will fruit, and how much fruit they will yield; also what extent of land should be planted to yield a sufficient return to pay for superintendence and up-keep, with a profit of Rs. 6,000 annually.

If you could let me know whether there is a good market for oranges in Calcutta, and what prices they fetch, it would be an additional obligation.

T.

Vizagapatam, 31st August 1885.

NOTE.—The orange should be raised by budding on the common lime or lemon. The operation should be performed in February. In the December following, the young trees should be planted out at a distance of 20 feet apart, in large holes 3 feet deep and 3 feet diameter, filled with a rich soil composed of well-decayed cow-dung, night-soil, common black earth, and a small quantity of slaked lime. The trees blossom, as a rule, in February and March, and the fruit is ripe by November, and sometimes earlier. They last till the end of January, and sometimes February; but the fruit should, for the sake of the trees, be all removed by January, to allow the plants to rest a little before flowering again in February. The soil should have a top-dressing of manure every year just before the trees begin flowering. A well-grown tree, say about 3 or 4 years old, will yield from 20- to 500 fruits. We have known them to yield a great deal more. It is difficult to say what extent of land should be planted to yield the revenue our correspondent names; but we should think from five to eight acres would be sufficient. The price of labour and material, as well as the markets in different parts of India vary so considerably, that much would depend upon local conditions. Oranges certainly find a good market in Calcutta. The average price for really good fruit, during the height of the season, is four annas per score. They are much dearer at the beginning and end of the season. Calcutta is plentifully supplied with this fruit from Sylhet, whence the best specimens come, and we should not think their importation from Vizagapatam would prove profitable to the growers, unless they came at a time when the existing supply was falling off. In conclusion, we may add that the orange is a gross feeder, and requires to be kept well watered at the time the fruit is setting.—ED., I. A.

Editorial Notes.

AMONG our selections will be found an interesting paper on a French Open-air Silo. This is the first one of the kind we have heard of, but doubtless others will soon be following the example. Perhaps before long, the question, 'how will I build a silo?'—will cease to trouble farmers and others engaged in ensilaging fodder.

⁂

THE Government coffee crop in Java for the end of June 1885, was estimated at 611,890 piculs, or only above one half of the average yearly yield. The coffee belonging to private individuals exported from Java during the first two quarters of the year also shows a falling off of about 36 per cent, when compared with the quantity exported during the corresponding period of last year.

⁂

AT a meeting of the Executive Committee of the proposed Agricultural Exhibition, held on Sunday, the 6th instant, at the hall of the Chinsura Club, it was resolved that, as the greater portion of the district of Hooghly had suffered much from the flood caused by the late rains, it was not advisable to hold the Agricultural Exhibition during the ensuing cold weather. The Committee have judiciously postponed the Exhibition, as it will take some time for the country to recover from the effects of the flood.

⁂

THE following is quoted as an instance of the great falling off in the price of land in England. At Spalding in Lincolnshire, a good farm of 110 acres was offered for sale, but the highest bid reached £2,370, or about £21 10s per acre, and it was consequently withdrawn. This very farm when put up for auction in 187[illegible] was bid for at £6,250, or nearly £57 per acre, but the vendor refused to sell, as he did not consider it a sufficiently high price. Since then £2,000 had been spent in protecting the farm from an adjoining river.

⁂

WE understand that the Bombay Abkari Commissioners have been recently instructed to include the item of fresh toddy in their programme of enquiry. This will give general satisfaction. What is now wanting to make the Commission a success, is to enable it to visit a few of the mofussil towns, say Thana, Alibag, Surat, and Broach. The tour will not cost much to speak of, and it will allay popular excitement once for all. The Commissioners, too, may enjoy a cold weather trip to Gujerat, and a flaggon of toddy may not come amiss to any of the worthy trio.

⁂

THERE is a prospect that we may soon cease to see ginger grown in Jamaica, which has so long held a high place in the market; for according to the *British Trade Journal*, "the cultivation of ginger in Jamaica is said to be dying out, on account of the persistent cultivation of the same plant on the same land for a long series of years. Only the richest and best lands are suitable for the cultivation of ginger, and, as it is a very exhausting crop, the production of the article on the island depends on the reserve of good land still available where it is cultivated."

⁂

THE Secretary to the State Board of Agriculture, U. S. A., has intimated that no report will be issued by the Board for August, but has stated that the estimate for wheat is 46 per cent of full crop, or 18,884,822 bushels. The corn is said to be doing finely, and now promises an average crop of 90,000,000 to 100,000,000 bushels. Oats are reported to cover a very heavy and large area, and may give 30,000,000 or 20 per cent above an average full crop. Hay, wheat, and oats are nearly all secured, and are in good shape; hay at a three-quarter crop, while pastures are good.

⁂

A CONTEMPORARY says :—

The Mysore Government, having in mind the famine of 1877, have taken the precautions to try and meet the impending one with caution. We learn that two Executive Engineers proceeded the other day, one to Tumkur, and the other to Kolar, to form estimates for all available relief works. Two other Engineers have also been ordered by the Dewan to be in waiting, to proceed at a moment's notice, to such places as the Dewan may direct. A visitor to Kankanhully states that the crops are all withering, and the ryots are very much depressed in spirits, and exclaim that if the rains should hold off for another week, they will have to meet the famine with a vengeance.

⁂

ACCORDING to the *British Trade Journal*, "rice occupies no less than one-half of the cultivated land in Japan, where there are 250 varieties of seed. Probably no country raises such a variety of leguminous plants for food. It is characteristic of the manner in which the French have waged the war—or, to be quite correct, the 'military operations'—against the Chinese that they declared rice to be contraband of war. This is the first time in history where provisions have been so treated, except in cases where they were being conveyed to a beleaguered city, or for the relief of an army threatened by starvation. International law will very soon have to be re-written, with annotations by M. Ferry."

⁂

WE have received, though a little late in the season, a copy of the Official Record of the New South Wales Commission for the Calcutta International Exhibition. It comprises the report of the President, with appendices, some other reports, and an abridged catalogue of the New South Wales exhibits and list of awards. It is illustrated with photographs of the various New South Wales courts, while the frontispiece gives a general outside view of the Exhibition building. It is also accompanied by a ground plan of the New South Wales courts. The report is a comprehensive one, and is a credit to the Australians, who evidently take much pride in the excellence of their products as evidenced by the appreciation shewn for them at the great show.

⁂

WE understand that a parcel of Khaki cotton, grown experimentally by Mr. A. Randle, of Wanowrie, has just been manufactured into drill at the Yerrowda jail. The cloth is said to be of a dun, or rather fawn colour, suitable for soldiers' uniforms, and of course needs no dye. Mr. Randle is of opinion that such cotton would be profitable as an annual field crop in that locality. The yield is reported as good, and the plant needs no irrigation. It seeds so freely that cultivation could be rapidly extended. It may be noted that this Khaki cotton is perhaps nothing more than the "Nankin" variety which has so long been cultivated in many parts of India. We remember to have seen, some years back, cloth of very good quality manufactured at the Jeypore jail from Nankin cotton raised by seed on the jail grounds. The color is perfectly 'fast,' and no amount of washing will change it.

⁂

THE Foreign Sugar Bounty question has greatly exercised the English people, for we learn from a home contemporary, that at a meeting of the leading workmen of the sugar trade in Liverpool, on the 23rd July, to consider the question of a law to meet the competition of the foreign bounties system, resolutions were passed condemning the system, and agreeing to appoint delegates to accompany a deputation to the Prime Minister, to direct his attention to the urgent necessity of providing an efficacious remedy to neutralise the foreign bounties system in British markets. This means business. The question has been so thoroughly thrashed out, that it would be tedious to recapitulate here. The only community that benefit by the system are the consumers, and they are not likely to raise a voice against a cheap supply. The British trade of course suffers, and the opponents are quite right so far to protest against the system.

⁂

THE September number of the *Indian Forester* contains more than the usual amount of matter to be found in this useful periodical. The hint thrown out a short time back that

Indian Forest Officers should contribute more largely to its pages has had a good effect, we see. In the present number we notice the "Brandis Prize for Sylviculture," which has been founded by the great Indian forester to encourage a closer study of the subject. A sum of Rs. 2,000 has been invested in 4½ per cent G. P. notes, and the interest on this sum, Rs. 90, "will be given annually for the best English essay on any subject connected with Indian Sylviculture by any past or present regular student of the Dehra Doon Forest School, or of any other Forest School in India. The essays should be clearly written, and should not contain more matter than will fill 20 pages of the size of the *Indian Forester* in ordinary type." Here is a chance for Forestry students to distinguish themselves.

⁂

Mr. J. S. Gamble, the Conservator of Forests, Northern Division, Madras, has been turning his attention to charcoal-making on an economical scale, and intends carrying out an experiment with a closed iron charcoal-making kiln, manufactured by the firm of Messrs. Bichon & Co., of Paris. With regard to the utility of this kiln, Mr. Gamble says: "So far as can be judged by the account of it, it appears to me to be likely to be very useful, and to save the trouble and damage to the ground which result from the ordinary system, while giving a better outturn and also a considerable quantity of tar. If it proves successful, it will make it possible to utilise the produce of forests now too distant for working, and more especially in the Nilgiris, to make the produce of the Coonoor plantations, for which there is at present very little demand, and where good flat places for ordinary charcoal kilns are very difficult to find, available for the supply of Ootacamund, and even of places in the plains." His proposal has been sanctioned, and an indent has been sent to the India Office for one of these iron kilns. We hope soon to hear more about this experiment.

⁂

The *Scientific American* publishes a novel use of toads, which we reproduce: "The latest and most ingenious way of getting rid of cockroaches and water-bugs we have heard of, is related of a citizen of Schenectady whose kitchen was infested with them. A servant, hearing that toads were an antidote, caught three ordinary hop toads, and put them in the kitchen. Not a cockroach or water-bug, it is stated, can now be found in the house. The toads have become domesticated, never wander about the house, and are so cleanly and inoffensive that there is no objection to their presence. Another use for toads is to employ them as insect destroyers in the garden. They are determined enemies of all kinds of snails and slugs, which it is well known can, in a single night, destroy a vast quantity of lettuce, carrots, asparagus, &c. Toads are also kept in vineyards, where they devour during the night millions of insects that escape the pursuit of nocturnal birds, and might commit incalculable havoc on the buds and young shoots of the vine. In Paris toads are an article of merchandise. They are kept in tubs, and sold at the rate of two francs a dozen." Farmers and agriculturists should take note of this.

⁂

A little time back, we remember to have read somewhere that long keeping of ensilage destroyed its good qualities. We learn, however, from a home contemporary, that Dr. E. L. Sturtevant has reported the result of an experiment tried at the New York Experiment Station, to determine whether fodder placed in silos, at long intervals, would keep without spoiling. In a small, well-built silo, ten by twelve feet, six tons of cut corn and sorghum fodder were placed during the latter half of August last year, filling it about three feet. It was covered and weighted. A month later it was opened, and a ton and a half of sorghum put in. On the 10th of June, this year, the silo was opened, and with the exception of six inches on the top, the ensilage was found in 'an excellent state of preservation.' By analysis it was found to contain one and-a-half per cent of acetic acid. A larger mass would probably, says the *Albany Cultivator*, have given a higher heat by fermentation, and caused less acid. There is no difficulty, as a matter of course, in partly filling a silo and giving it proper weighting, and adding more [illegible] ks afterward, and again replacing the weight. Th[illegible] t be harmed by the added weight, and the latter [illegible] condition as the first. In all such experi[illegible] should be matured enough to have solid[illegible] ance. Ensilage has been renounced by some in consequence of cutting it when too soft and juicy.

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We have in these columns discussed at some length the system of ensilaging fodder, and have taken a warm interest in the question as a whole from the time it first began to attract attention in this country. It is needless to say that we have followed closely every phase of the question, and have endeavoured to show from theory and practical experience, what we regard as the keystone to the method. But much ignorance prevails; and there is such diversity of opinion as to the real and practical value of ensilage, that it has, from the beginning, been difficult to get at the 'rights' of the matter. That this was felt to be the case even in England, may be gathered from the fact that a Royal Ensilage Commission was appointed to make a thorough enquiry into the subject. The labours of this Commission have now come to an end for the first portion of this year, and we learn that the report containing the evidence taken so far, will be issued at an early date, while the second portion, with the evidence to be collected in autumn, will appear as soon as it can be arranged. Both publications are to be prepared under the direction of Lord Walsingham, the Chairman of the Commission. There will, therefore, soon be abundant matter on which to discuss the benefits of the ensilage system. We hope to receive these reports as soon after publication as possible, and will then give our readers the benefit of all the most important information that may be contained in them.

⁂

Lord Reay's public utterances on Indian questions are so far quite worthy of his reputed scholarship and the good name which preceded him in this country. We have already noticed his resolution on the inexpediency of curtailing the freedom and discretion of judicial administrators. That resolution is inspired by the true spirit of constitutionalism. Let us now turn to some very wise things which he lately addressed to the Bombay Forest Commission.

"Agricultural problems have always struck me as peculiarly interesting, and the more one looks into the various agricultural systems of various countries, the more one becomes convinced that our legislation in agricultural matters is a mistake, and that in the present condition of agricultural science, which is not by any means so far advanced as it ought to be, we must be careful to interfere as little as possible. Agricultural centralisation would certainly lead to disastrous consequences. To introduce into Lancashire the agricultural system of the lowlands of Scotland or the Ulster custom would betray rashness. Local wants, local customs, and local systems of village tenure have a right not to be wantonly disturbed unless a very good cause be shown for it. In many instances a scientific justification for local agricultural practices unconsciously observed by the population will be forthcoming. I approach agricultural questions with a strong bias in favour of the agriculturist, as every Scotsman would, who has been accustomed in Scotland to give the most respectful considerations to the experience of shrewd farmers and shepherds and farm servants."

What a waste of Indian money would be prevented if the ardour of agricultural reform in our rulers were moderated by such thoughtfulness as breathes in every line of the above extract.
—*Indian Echo.*

⁂

The extract from "G. O.," published by the Government of Madras, lays down the programme which it is proposed to carry out in respect to agricultural operations in that Presidency. In the first place, the Saidapet Farm is to be abandoned on its present scale, as a practical failure. It is considered too small for stock-breeding; and its soil is pronounced unsuitable, and "our knowledge of Indian crops too limited as yet for useful experiments." This last is certainly an admission for which we were not prepared. New farms are to be instituted, however, but experiments, will, where necessary, be carried out with the assistance of private agency under the general supervision of the Agricultural Department. This is, of course, as it should be ; for, according to Mr. W. Wilson, this Department "is nothing if not practical." Native agriculture, and the analysis of districts will be carefully 'studied' by the Agricultural Reporter, with a view to introduce better methods where they are wanted, 'but there only.' Further than this, the Government are not at present disposed to go. "To assist the Agricultural Reporter, in investigation, the Government propose eventually to entertain a small body of District Agricultural Inspectors whose salaries will be met from the savings which will accrue from the abolition of the farm. These men will, previous to their entertainment, have undergone a course of training at the Government Agricultural School."

We are somewhat sceptical about the 'savings,' but we may be wrong. The further proposal of the Director of Public Instruction to attach some 30 or 40 acres of land to the Agricultural College as a farm *annexe*, as a field for practical demonstration and training for the students of the College, is a good one ; and as the necessary details of administration of the Agricultural School, and the course of instruction to be followed therein, are to be considered by the Educational Department, we may hope to see matters placed on a more satisfactory footing than appears to have been the case in reference to the now doomed Saidapet Farm.

⁂

We extract the following sensible remarks on grazing grounds from the *Civil and Military Gazette*. The subject is deserving of close attention:—"The deficiency of grazing grounds in the North-West Provinces is even more marked than in the Punjab. Several district officers have dwelt upon the desirability of Government interference in this matter in their revenue administration report for the past year. 'One most important measure which might be introduced,' writes the Collector of Shahjehanpore, 'would be to insist, wherever practicable, upon a proper allowance of reserve forest or grazing lands being kept up for each village or group of villages. This would serve three purposes—prevent denudation of forest, starvation of cattle, and perhaps immoderate use of cow-dung *for fuel.' In the Hamirpore district*, the owners of 14 villages agreed, at the last settlement, to take certain measures for preserving the trees remaining on the waste lands situated within their boundaries ; and undertook to pay a higher revenue if they should fail to keep their agreement. Probably a good deal could be done, by means of petty remissions of revenue, to encourage the villagers of the Punjab to plant and preserve trees in the village jungles ; but as far as we are aware, little or nothing has been attempted on a large scale in this direction. It is almost needless to repeat that grass cannot be maintained in the plains during a drought, unless it is protected by a fair growth of trees and bushes ; and that these, besides serving the above purpose, further afford considerable supplies of those make-shifts for fodder with which the cattle are obliged to be content in such seasons. From the Kumaon district, it is suggested that the preservation of ensilage would be particularly useful there, as green grass is almost unprocurable in April and May in each year." The reference to ensilage is important. It has often been urged that in places subject to severe drought, or where fodder becomes scarce from the scorching effects of 'hot winds,' the remedy is to be found in *ensilaging* fodder at a time when it is plentiful. The Punjab is particularly subject to hot winds, and so is Rajpootana, Central India, and Sindh. At the first approach of April, the hot winds set in, and fodder becomes scarce. It is, therefore, of importance that during the rains, and the winter months, provision should be made by ensilaging fodder for a '*dry* day.'

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The following notes of the annual visitation of the Highland and Agricultural Society to their experimental station, which we extract from the *North British Agriculturist*, will doubtless be read with interest here :—Dr. Aitken, along with several members of the Highland and Agricultural Society and others, made the annual visitation of the Society's experimental station at Pumpherston recently. The crop this year is oats after beans. Owing to the excessive drought, this season the station, in common with many fields under oats, has suffered considerably, so that what is called by farmers tulip rot is somewhat prevalent. The observations drawn from this disease on the station show that where the most liberal application of manures was made, the disease was at its lowest, while those parts of the station from which manures of a certain kind had been withheld, or only sparsely laid on, were most affected by the disease. The best plots on the station were those to which soluble phosphate had been applied. Amongst undissolved phosphates bone meal was, upon the whole, most effective ; but there was little difference between dissolved phosphates from any source. Muriate of potash has this year produced a better result than sulphate. Amongst other manures, fish guano, which hitherto has not been prominent, has produced one of the best crops on the station, and nearly free from disease. Dr. Aitken suggested that this was probably due to the residue which had been left in the ground from the manuring of former years, this plot having been noticed to be improving year after year. The plots manured with superphosphates show, as in former years, that it is not advantageous to use phosphates whether too little or too highly dissolved. Considerable discussion took place amongst those present concerning the disease which is so prevalent in the oat crop this year, and it was pretty clearly made out that while drought is mainly the exciting cause, the kind of manures used have some influence, and this matter will, no doubt, be reported upon when the crops are analysed. At the close of the examination, on the motion of Mr. Paterson, of Bankton, a hearty vote of thanks was accorded to Dr. Aitken for the intelligent manner in which he had explained the large and interesting experiments. These tests, he said, were of great importance and of much advantage to agriculturists, and it was satisfactory to see they were carried on in so efficient a manner.

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The following circular, dated 10th September 1885, has been issued by the Indian Tea Association regarding the representation of Indian Tea at the London Exhibition of 1886 :—

The General Committee of this Association have been requested by the Indian Tea Districts Association of London to bring to the notice of all interested, the arrangements that have been made by them in London as to the Indian Tea Room at the Colonial and Indian Exhibition of 1886, and I am, therefore, directed to give you the following particulars, as supplied by their Secretary :—

It has been arranged that Messrs. Henry S. King and Co., of 65, Cornhill, London, shall take charge of the Indian Tea Room at the Exhibition, under the supervision of a specially-appointed Sub-Committee of five members of the London Association.

The only name which will appear in the Tea Room will be the Indian Tea Districts Association of London and Calcutta.

It is desirable that samples of tea intended for exhibition should be prepared before the end of October, and the London Committee make the suggestion, the adoption of which is, however, optional, that the samples be limited to four kinds or descriptions, say, two of whole and two of broken leaf, as being fairly representative of the entire manufacture of the estate.

Each sample to be not less than 1lb., or larger than 5lbs., and to be packed in lead so as to travel without risk of injury. The samples should be very carefully labelled and sent before the end of December next to Messrs. King, Hamilton and Co., Calcutta, by whom, and at whose expense, they will be despatched to London. Suitable bottles and labels of a uniform kind will be provided in London for the proper display of the samples.

It is suggested that some estates may be willing to furnish neat 5lb. or 10lb. boxes, with the garden name and brand, with the view of attracting the attention of the small trader, as well as the consumer, and for competition with the sightly and attractive little China boxes. These packages can also be sent to Messrs. King, Hamilton and Co., who are prepared to take charge of any photographs, horns, spears, or other articles of interest which may be contributed by planters for the decoration of the Tea Room, and who will undertake to have them mounted in Calcutta and sent home free of expense. Those who attach a special value to any article should signify their desire as to its disposal at the close of the Exhibition.

The total receipts of Indian Guaranteed Railways, from 1st April to 15th August 1885, were Rs. 3,06,06,570, against Rs. 2,93,91,904 in the corresponding period last year; while those of the State lines were respectively Rs. 1,71,19,133 and Rs. 1,42,87,100. The total receipts of Assisted Companies amounted to Rs. 12,84,009 and Rs. 3,38,907, respectively, during the same periods. The railways in Native States show total receipts of Rs. 10,74,776 and Rs. 10,67,622, respectively, during the above-mentioned periods. Turning to estimated expenses, we find that those of Guaranteed and State lines have been included under one head, and were Rs. 3,53,85,703, and 2,14,78,118, respectively, during the periods noted above. These figures show that the net receipts on both Guaranteed and State lines exceeded the expenditure by Rs. 3,21,53,256 from 1st April to 15th August 1885, and by Rs. 3,03,79,657 during the same period in 1884. Taken at an average, these figures show a decided increase over the receipts of 1884; but, separately, the following Guaranteed lines show a falling off:—

	Rs.
Madras	48,773
South Indian	26,425
Great Indian Peninsula	3,14,495

The following State lines also show a falling off:—

Eastern Bengal	96,512
Nalhatti	5,839
Northern Bengal	26,1[illegible]1
Cawnpore-Achnera	30,106
Wardha Coal	25,657
Nagpore-Chattisgurh	1,445
British Burmah	33,614
Sindia	4,819

The seven Assisted Companies all show a remarkable increase, amounting to Rs. 9,45,102 over the receipts of the previous year. In no instance is there a falling off. Among the lines in Native States, only one shows a decrease, *viz.*, the Bhavnagar-Gondal, amounting to Rs. 1,09,753. Out of the 20 State lines, nine show a decrease, amounting in the aggregate to Rs. 2,24,249. The greatest falling off is shown by the Great Indian Peninsula, *viz.*, Rs. 3,14,495; the aggregate decrease in the receipts of the other two Guaranteed lines amount to Rs. 75,198. The total mean length of Guaranteed lines open during 1885 was 4,133, against 4,025 in 1884, while the State lines were respectively 4,143 and 3,764 miles. The Assisted Companies had respectively 833 and 409 miles open, and the Native States 394 and 358 during the same period, *i.e.*, from 1st April to 15th August 1885 and 1884.

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CERTAIN planters of the Nilgiri district have been much exercised with regard to the cheap sale of firewood by Government to the detriment of private enterprise, and have addressed a petition to the Governor of Madras, protesting against the action of certain Government officials in this respect. Their complaint appears to be—

> (a) That the Forest Officer of the Nilgiri district takes contracts for the supply of firewood at low rates, lower than have prevailed for 40 years—and that he has taken a contract to supply dry wood at Rs. 6 7 per ton.
>
> (b) That in order to obviate the extinction of the planting enterprise, Government must "prohibit its officers from taking contracts for the supply of firewood, and selling wood to private parties," and confine them to the supply of "Government brick-fields and other kindred requirements."

The Collector of Nilgiris is of opinion that some of the signatories of the petition are engaged in planting firewood trees for sale to the public, but that the majority have only sufficient for their own requirements; and that by the retirement of Government from the field, the price of firewood would be raised so high as to cause serious hardship to the poorer consumers. Looking, therefore, from the consumers' point of view, the participation of Government in this enterprise can only be looked upon with satisfaction. On the other hand, however, the petitioners say that "there is now a considerable amount of wood available for the public," and it may be inferred that if Government enters into competition with them, private enterprise must go to the wall. It further appears that sixteen persons obtained allotments of land aggregating 506 acres in 1869 for fuel plantation, and it is to these grants that the petitioners refer. The Collector, however, points out that the land of fourteen persons, representing 428 acres, has been resumed, in consequence of the grantees having failed to plant it; and that only two persons retain their land to the extent of 77 acres, and that even in these the planting has been imperfectly done. Under these circumstances, the Collector upholds the participation of Government in this enterprise, and denies that the rates have been unduly lowered. To our mind, the petitioners have failed to make out a strong case. If they have neglected to utilise properly the land granted to them, they cannot expect the consumers to submit to pay high rates, when, by Government stepping in, they are enabled to buy firewood at cheaper rates. The Government of Madras have however, taken a more liberal view, and after consulting the Conservator of Forests, have issued the following order, which should meet the case on both sides:—

> The Government observe that large State forests are maintained in this country for reasons of paramount importance to the community. The thinnings and loppings of these forests must be disposed of somehow, and there does not appear to be any difference in principle between selling such cuttings wholesale and selling them by retail. The Government concur, however, in the opinion expressed by the Conservator that for reasons of departmental convenience, it is desirable to substitute sales on the plantations, if possible, for the existing system. They resolve, therefore, to direct that for the present the system of sale at the Government depot be maintained, with the modification that deliveries at houses should cease, but that after November 1st, the cuttings on plantations and sholas, in compartments to be set apart for the year, be sold by auction in the manner proposed by the Conservator. Should this experiment prove successful the depot will be closed, but a reserve of one thousand tons should still be maintained ready for sale, in case the artificial advantage now to be conferred on certain private growers should result in an undue raising of the price of fuel to the prejudice of the poorer classes. The issue of tickets for head-loads to bazaar purchasers will continue as at present.

THE FUTURE OF INDIAN WHEAT.

IT has often been said that the tract of country comprising the North-Western Provinces and Oudh is the 'Granary of India.' Judging from the annual trade returns, and the forecasts drawn up by the Director of Agriculture and Commerce, North-Western Provinces and Oudh, they would seem to be a good foundation for this conclusion. On the other hand, the Punjab, where almost the entire native population use wheat-flour as their staple food, may be regarded as the wheat-consuming province of India, and the importance of extended and better wheat cultivation has come to be adequately recognised by the Lieutenant-Governor of the Punjab, who has issued a most important resolution on the subject, in which the whole of the information which has been recently collected regarding the present conditions of the wheat trade of that province, and the suggestions which have been made for its improvement and development, have been gathered together. In taking up the review of a question which so vitally affects Indian interests, it will be as well to note briefly the opinions and suggestions embodied in the resolution under reference. In March 1879, Dr. Forbes Watson, in his report on the subject, considered that India was admirably suited for the growth of the finest qualities of wheat, both soft and hard, and expressed an opinion that the Punjab was probably destined to become the chief wheat-exporting province of Hindostan; and suggested that the cause of the inferior quality of Indian wheats was due to their mixed condition, which might be removed by the introduction of simple screening and winnowing machines. Later on, the question of cheap railway freight came to be considered as an important factor in the export of wheat, if it was intended that it should compete in the home markets with American wheat; and Kurrachi was recognised as the best port of shipment. Its advantages were said to be as follows:—"Situated at the extreme northern end of the Indus Delta, it is connected with the entire river system of the Punjab. It possesses a harbour safe and easy of approach, with fairly regular soundings, and few formidable currents. It has the additional advantage of being northward of the limit of cyclones. It is less affected by the south-west monsoon than most parts of Western India. Being nearer by 200 miles to Aden, and bringing as it does the great part of the frontier 1,000 miles nearer to England than the route *via* Bombay, the importance of the port of Kurrachi, as an outlet to this province (Punjab) can hardly be exaggerated." This was said at the end of 1882, when wheat was delivered at Kurrachi at Rs. 3-2 per maund. It is now being exported at Rs. 2-7 per maund; and as the sea freight is now 43 per cent lower than it was in 1882, wheat can be delivered in England at 10s. 7*d*. per quarter less than it could be two years ago, which shows how the Punjab wheat trade has increased. This is further proved by the fact that, in 1879, the export of wheat to Kurrachi was valued at Rs. 74,608; and in 1882-83, exclusive of river traffic, at Rs. 51,42,886; while during the past year it had further increased to Rs. 54,71,950. Although the exports to Bombay have increased from a weight of 218,897 maunds in 1882-83 to 1,433,576 maunds in 1883-84, while those to Calcutta have decreased from 240,032 maunds in 1882-83 to 211,384 maunds in 1883-84, it is considered that there is no reason why Kurrachi should not become the natural and geographical outlet for the Punjab. Hitherto, Kurrachi has engaged but a very small portion of the trade of India, as will be seen from the following figures, which show the proportionate value of the foreign trade of each of the five chief ports during the year 1883-84:—

	Per cent.
Bombay	41·57
Calcutta	38·48
Rangoon	5·07
Madras	5·28
Kurrachi	3·37

During the past year, however, the figures for Kurrachi show a marked increase, amounting to 13·56 per cent of that during 1882-83.

The resolution notices the pamphlet entitled "Punjab Wheat," by Colonel Wace, Commissioner of Settlement and Agriculture, which gives in a succinct manner the actual conditions of wheat production in the Punjab, and which is calculated to prove of real practical value from every point of view. Having seen this pamphlet, we entirely agree in this opinion. Colonel Wace has produced a compilation which, for practical suggestions, and accuracy and clearness of detail, can hardly be equalled.

The Resolution then refers to the disadvantages under which the wheat trade of the Punjab suffers. These, for convenience of discussion, are treated as (1) economical, and (2) administrative and physical. The chief economical drawback is said to be the dirty condition in which the grain is usually purchased; and it is suggested that the first thing is to obtain, if possible, a clear wheat for export, unmixed with dirt and other foreign grain. This is a drawback from which all the provinces suffer, and which is the main cause of the depreciation of Indian wheats in the Home markets. Colonel Wace rightly observes that reforms in this direction can be looked for only very gradually from the cultivators as a body. It is, however, clearly indicated that the agriculturist has at present little or no interest in turning out a clear sack of wheat, as he gets no more from the middleman for the cleaned article, than for the uncleaned. But this is a state of things to be met with all over the country. The only part of India we know of, where a better state of things exists, is the North-Western Provinces and Oudh. Here much care and attention are bestowed upon the production of wheat, free from dirt, and in distinct varieties. The Lieutenant-Governor of the Punjab is correctly informed that these drawbacks obtain to a marked degree only when the cultivator is deeply in debt to the middleman. The middleman, then, is the real obstacle in the production of superior grain; and the only remedy in our opinion seems to be the one suggested in the resolution, viz., that the work of cleaning the grain should fall rather on the trader than on the cultivator; and were enterprising firms to establish depôts of machinery for cleaning grain. such as that of Ralli Brothers, referred to in the resolution as having been opened at Umritsur, there can be little doubt that, in course of time, cultivators would bring their grain to be cleaned by machinery which would cost them a mere trifle, and thus obtain better prices. We have heard of some such depôts having been established in the Bombay Presidency, which have worked with advantage, not only to the cultivators, but to the proprietors of the machines as well. There is then the question of carriage from the place of production to the place of threshing.

(*To be continued.*)

LIGHTNING STROKES.

In a recent discussion before the Royal Meteorological Society, it was asserted that meteorologists generally only spoke of lightning *descending* in a careless sort of way, because it was connected with the appearance of clouds which certainly passed over our heads, and that it was always understood that describing a lightning stroke, as coming downwards, was merely the conventional style of speaking. These remarks were elicited from two leading authorities, who observed that any one who gave the subject consideration would come to the conclusion that the discharge was *double*, and that most of the damage done was due to the *upward* stroke. The fact of the matter would appear to be, according to the same sources, that no definite direction can be assigned to a lightning stroke. According to the indications of the electrometer at Kew, the earth was sometimes positive and the air above negative, and *vice versa*. The Superintendent of the New Observatory, who is one—the President of the Society being the other—of the authorities to whom we are indebted for our information, observes on this point: "It did not matter in which way the electric current passed through an object, for the effect was due to the explosive decomposition of the object through which it passes—whether it were water converted into its constituent gases by electrolysis, steam at high pressure, or vaporised metal. Under any circumstances, great force would be generated by the passage of the current." These views are somewhat at variance with hitherto accepted theories. Hence we find Colonel the Hon. Arthur Parnell, late Royal Engineers, in a subsequent paper (read on the same date) before the Society dealing with "The Mechanical Characteristics of Lightning Strokes." The gallant physicist here presents to the scientific world the results of his researches, in regard to the action of terrestial electricity during the last five years He says: "Having, as I believe, entered into the special study of lightning phenomena with no preconceived physical conceptions contrary to those generally held, the principal impression that these investigations have left on my mind, up to the present time, is that a lightning stroke is a manifestation of ordinary physical force effected in a highly concentrated form." He then adduces some notes and facts tending to demonstrate the mechanical nature of lightning strokes, and the direction, in regard to the surface of the earth, that is usually taken by them. The value of the results may be gauged from the fact that they are deduced from 1,117 incidents of lightning stroke action extending over a period of 219 years—from January 1665 up to February 1884! The particular conclusion arrived at is—(i). That "lightning" is not a sort of electric fluid that descends from the clouds, injures buildings and persons in its course, and dissipates itself in the earth; but that it is a luminous manifestation of the explosion caused by two equal forces springing towards each other simultaneously from the earth and the under-surface of the inducing cloud, and coalescing, or dying out nearly mid-way between the two plates of the electrical condenser formed by the earth and the cloud. (ii). That of these two forces, it is the earth-sprung, or upward force alone which injures buildings, persons, or other objects on the earth's surface, and which constitutes tangibly what is rightly known as a "lightning stroke." The first conclusion is confirmed by the discoveries and experiments of various eminent men, including Franklin, in 1753; Delaval, 1764; Adams, 1794; Harris, 1842 Arago, 1835; Ganot, 1868; Tait, 1880; and later authorities. The second conclusion, re "Upward Strokes," is equally well substantiated. The evidence, relative to the only solitary incident of alleged "down stroke," is sifted and disposed of as probably untrustworthy. The Colonel says, on this head: "That there should be difficulty after careful and close research in obtaining even one single authentic case in history, wherein the action of a downward force can be proved, is in my opinion vindication of the theory that holds these actions to be invariably upward." He has laboratory experiment and electro-statical law with him; and, considering that he is opposed to a long popular notion, we are disposed to concede that the records produced demonstrate, with more or less precision, the existence of an upward direction in the force of the stroke.

In India, lightning strokes often produce disastrous results, and are attended with much loss of life. The current year has been prolific in loss of human life by lightning. A great deal of ignorance prevails in regard to the action and tendency of lightning strokes; and the foregoing hints will, we hope, remove some of the popular and generally accepted ideas on the subject, which, we fear, has received too little attention in this country. A proper study of the laws which govern electrical phenomena would show the futility of the so-called lightning conductors, that may be seen rearing their pointed heads above the roofs of our dwelling-houses, churches, and large public buildings.

Miscellaneous Items.

Information has been received from her Majesty's Minister at Teheran, of the notification by the Persian Government of an interdict, with effect from 11th September, on the exportation of grain from Persian ports.

From Nagpore we learn that 37·13 inches of rain have fallen there, which is about 4 inches above the average, to date. Berar needs more rain for the cotton and *kharif* crops. Cholera is rather severe in the Akola district (Berar.)

Efforts have been made within the last year or two in Fiji to acclimatize the tea plant in those islands, and last advices from Levuka *viâ* Auckland give very encouraging reports of the tea industry. The tea is described as being of excellent quality.

Captain B. D. Plummer has been appointed Chief Superintendent of Mysore and Nundydroog mines. Owing to the extensive work now being carried on at these mines, a batch of fifteen Italian miners arrived from London last month, and proceeded to the mines.

Owners of casuarina plantations, who hitherto supplied the railways in the presidency, not being in a position at present to supply wood, owing to their stocks being exhausted, the Railway Companies find it a difficult matter to procure wood, unless at enhanced rates.

A Correspondent of nearly 20 years' experience in Japan, who has the interests of the country at heart, writes as follows:—"There is far too much rice cultivation in this country, and it is the cause of infinite mischief to the population; as not only the cultivators, but all in the neighbourhood, have their general physique lowered by the malaria from the fields. Not only the mulberry, but all the European grain and vegetable crops could be grown in these fields, and it seems to me that Government should, by the annual distribution or sale of imported seeds, encourage the people to get out of the old routine and to grow new crops.

The persistent holding off of the rainfall in the Deccan is beginning to cause anxiety there. With only two or three weeks of the south-west monsoon remaining, barely half the average fall has been reached. Indeed, it is feared that unless the rain comes very shortly, it will come too late to save the greater portion of the dry crops. The *Deccan Times* says that it is just possible that the scarcity anticipated in the Nizam's dominions will, if it occur, cause that prince to postpone his visit to England. The visit, carried through in a manner befitting his rank, must entail a vast expenditure, which the finances of the State can but ill-afford, and his Highness is very reluctant to put the country further in debt for a purpose that, however desirable in more prosperous times, is still a luxury which may well stand over.

The question of providing funds for carrying out the Tansa water-supply scheme was further considered by the Bombay Town Council, when it was resolved to levy a tax on kerosine oil of half an-anna per imperial gallon, which will be equivalent to four annas per case. The daily local consumption is stated to be about 500 cases, and the Municipal Commissioner estimates that the tax will yield an income of about Rs. 40,000 a year. Dr. Peterson was opposed to a tax of something like 8 per cent on an article whose consumption was extensive among the poorer classes of the city, and expressed himself in favour of reducing it by half. But there was a consensus of opinion that a tax of four annas per case could well be borne by this cheap oil, and a proposition to that effect was accordingly carried. No other business of public interest was transacted at the meeting.

The Indian trade returns for the month of July last continue to show a decrease in the value of merchandise imported; but a slight increase in the value of exports. The total imports during the current official year, up to the 31st July last, show a falling off of nearly 190 lakhs, as compared with the imports for the same period of last year; while the exports have declined by over 186½ lakhs. In the month of July there was an extraordinary falling off in the value of imports into Bengal and Madras, which quite overbalanced the increased imports into Bombay and Kurrachee. Turning to exports, we find that, in the same month, the value of exports from Bombay fell off; but there was a considerable increase in the exports from Bengal, Kurrachee and Burmah. The total value of exports from India during the month amounted to over 535⅔ lakhs, against less than 501¾ lakhs for the same period of 1884.

The Chamber of Commerce is now circulating a list for signature amongst its members for subscription to the fund being raised by the Planter Association to push Ceylon tea in London during the Colonial and India Exhibition, which we hope to see supported liberally by everyone. Another list, to be circulated amongst those who are not members of the Chamber and the general community in Colombo, is just being started, and it also should receive universal support from every class and interest in the island without any exception. There is no possible manner in which the public as colonists can better further the interests of the island than in subscribing to this fund. It is the cheapest possible advertisement they can get, and we shall be terribly disappointed if much more than the sum named by us is not forthcoming. Lists are also being circulated by the Secretary of the Kandy Planters' Association throughout the planting districts.

Selections.

EXTRACTS FROM THE PROCEEDINGS OF THE AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA,—Dated August 26, 1885.

Orange Cultivation in India.

From Dr. E. Bonavia:—

"I am endeavouring to unravel the different kinds of oranges and lemons known in India, and to find out all about them. Can you or any other member of your Society help me in the following:—Calcutta is supplied with the *Sylhet* orange. What do *natives* in *Sylhet* call *that* kind. Does it grow *wild*, that is, *self-sown*, without any cultivation, or is it planted regularly and *cultivated*, or *both*? Does it belong to the *Suntara* variety or to the *Keonla* variety? Are there any other varieties of orange or lemon or limes belonging to Sylhet, besides the one sent to Calcutta? If so, what are their names? Is the trade in Sylhet oranges extensive? Can you give me any idea of its *annual* extent in *rupees*, or boat-loads, &c.? Are Sylhet oranges ever washed down by floods into the rivers, and do they *float*? Perhaps you may have some members in Sylhet, who could kindly give me this information.

"If you make known to your members that you have the Malta lemon you might disseminate it readily."

A copy of this Society's Journal, Vol. I, No. IV., New Series, containing an account of a visit to the Orange Groves of Shalla, by Mr. Brownlow, was sent to Dr. Bonavia, who again wrote on the subject as follows :—

"I have to thank you for so kindly sending me the volume containing an account of the 'Orange Groves of Shaila.' It is exactly what I wanted, only it was written in 1869. To save you trouble I will write directly to any one in Sylhet, who can give me a little more *recent* information ; if you know any one, his *address* will oblige. Lime is a large constituent of the orange tree *wood*, and I fancy Mr. Waldie did not get a *typical* sample of soil, or only a sample of *surface* soil.* One of the exports is *limestone*, and it is hardly possible that in a region where limestone rock is so plentiful, that the detritus should not reach the alluvium in larger proportions. Do you know any other part of India beyond Sylhet and Nagpore where oranges are *largely* grown? Have you any account of the *Nagpore* (Satpoora range) Orange Groves in any of your journals? The Orange merchants in Calcutta will be able to inform you about how many 'Sou' (3,000 oranges) reach the capital in a season or perhaps how many *boat-loads*. Are they sent *now* by country boats or by *steamer*. I have a notion than the Mandarin orange, considered so choice in the Mediterranean, would do well in *Sylhet*. Have you got it in your Calcutta garden? If not you can get it either from me or Lucknow; the Malta egg, and blood, and common round, ought to do there also, could not you get them to *try* them? The Malta egg and blood, orange, are exquisite, and have *not a very thin* skin and therefore would travel well to the capital. It is my firm belief that the fruit trade of India is capable of *great expansion* with benefit to *every one*."

Some members have been addressed on the subject and with their sanction, Dr. Bonavia will be put into communication with them. Any information at the disposal of members will be welcome.

SILK.

From Mr. Natalis Rondot, Paris, Honorary Member, who writes to the President of the Society as follows :—"I have the honor to have been for the last [illegible] years an Honorary Member of the Society.

"I have just completed the first part of a work on the silk industry, which I wrote by the invitation of the Minister of Commerce of France. The first volume just issued, will be kindly handed to you by H. E. the Viceroy, and I beg you will present it to the Society on my behalf.

"The first volume is regarding the domesticated silkworm, and the second will refer to the semi-domesticated and wild silks, and will be finished during the year. I of course mention in this volume the Indian silkworm, and have done my best to state their condition."

From Mr. R. A. Manuel, Rangoon, forwarding a paper on the Silks of Burmah. Acknowledged with best thanks, and transferred to Journal, Vol. VII, Part IV.

CULTIVATION OF THE PATNA ONION.

An application was received from the Secretary of the Eurasian and Anglo-Indian Association, Royapetta, for seeds or bulbs of the Patna Onion of the large white-skinned variety. In the letter the Secretary says :—"I may mention that the Association has successfully established a Colony in a most favourable locality for the benefit of Eurasians and domiciled Europeans, where a number of families have been already settled in the pursuit of rural occupations. Among the settlers are men of education and intelligence, and it is one of the aims of the Association to place within their reach the means of entering into new enterprises."

Mr. W. B. Carshore, a Member of the Society, was communicated with on the subject, and gives the following information as to the cultivation of Onion in the South of the Tirhoot District :—"I think I can get you some Onion seed now, it is sown in February and when about 8 inches high, transplanted into convenient plots for irrigation ; these plants die down in June, when they are taken up. Those who require Onion seed, plant out the bulbs in August, and the seed will be ready in May and June, at about the same time as the new crop sown in February."

CEARA RUBBER.

Messrs. Begg, Dunlop and Co. applied for information regarding the Ceara Rubber for a correspondent enclosing the following extract :—

Extract of a letter from a Terai Tea Planter, dated 3rd August 1885.

"As far back as April last, I wrote you asking for information regarding the growing of Ceara Rubber ; you very kindly sent me a printed paper by J. P. William Brothers, Ceylon, on the subject and quoted price of seed, &c. Now for the last two years, I have been planting rubber in different places as an experiment, and have now got some trees over 11 feet high and 7 inches and more in girth, a foot from the ground, they are by no means weeds, nor are they wanting in milk, *i.e.*, rubber ; the least scratch causes it to rush out of the tree. I am convinced that this rubber, not only grows and thrives as a tree in this district, but that it would give a very large yield of dry rubber.

"What I write you about now is, can you inform me positively how much does it yield in its 5th, 6th, and 7th seasons, and what has its produce *been* sold for per lb., in London, or any other market."

The following reply was sent :—

"The planting and cultivation of Ceara Rubber are in such an early stage that sufficient data is not available, to admit of your enquiries being answered fully.

"From the extract from your Manager's letter, I should imagine the trees, he mentions, are as yet too young to be tapped profitably ; as they are only 7 inches in circumference at a foot from the ground, they can hardly be of more than two years' growth ; probably five or six years would be the earliest at which they should be worked."

Mr. Cross, a great authority, says, in a letter to the *Tropical Agriculturist* (November 1st 1884),—"The plants should be allowed to attain a good size before being operated on, they will then bear to be tapped or milked every day for nine months of the year. If the wood is not much injured in this operation, they will bear working for 20 or 30 years."

In Mr. Robert Cross's account of his discovery of the Ceara Rubber tree, he mentions the largest trees he saw tapped were some 50 feet in height, with trunks 9 inch to a foot in diameter. So it would appear either that the tree, when tapped, is not very long-lived, or that the climate of Ceylon is more suitable for its development, Dr. Trimen in his administration report of the Royal Botanical Garden, Ceylon for 1884, mentions having cut down a Ceara Rubbery tree, of nearly eight year's growth, that was 14 inches in diameter. As the plant was only discovered in 1876, this is one of the oldest of the trees of which a record has been kept. Dr. Trimen alludes to it as one of the original plants and says :—"This tree was thoroughly drained in 1882, but on now repeating the operation nearly 1½lb. of dry rubber was obtained." This answers your Manager's query, as to what is the yield in the 8th season, and although this is not enough for calculation, is the only data we have. Messrs. J. P. Williams and Brothers of Heneratgoda, Ceylon, in one of their recent circulars, state as follows :—"We have tapped a Ceara Rubber tree of six years age at the beginning of April ; three days' successive tapping, with an ordinary knife, gave 8½ oz. of dry rubber." The operation can be done twice a year. They further state that Ceylon Rubber has been valued in London at 3 to 4 shillings a pound.

ACCLIMATIZED MAIZE.

Messrs. Lloyd & Co. exhibited some fine samples of maize grown in the Terai. These cobs were grown from the seed of last year's crops, which again was the product of Australian seed. The cobs, as regards size of grain, bear comparison with the American Maize imported by the Society for seed, but are not so regular. The standard, however, is very high, as the American Maize in question is especially grown and cultivated for seed. Messrs. Lloyd & Co.'s experiments prove that a very superior class indeed of seed Maize can be grown in the Terai, the distribution of which in various parts of India would have a marked effect on the quality of this staple. The following are extracts from their Manager's letters on the subject :—

From Mr. Monypenny :—"I am sending you to-day by post a parcel containing cobs of Australian corn. These may be of some interest as they are from the third sowing. The cobs are not quite so large as those grown last year, but I do not think the grain has degenerated much. I hope shortly to send you some grown by natives. I have been shown some very good ones, but they are not yet ripe. As far as I am able to judge, the introduction of the Australian corn is a complete success, and likely to prove of great benefit to the natives." And in a later letter, he says :—

"I am to-day sending you by parcel post two cobs of Maize grown by natives in the service of the Company. The largest of the two is the finest I have yet seen, and beats anything I have been able to grow myself. It is some satisfaction distributing the seed when they are able to grow such produce as this."

Central Terai Tea Company.—Extract from Mr. A. Curry's letter, dated 13th August 1885 :—"The corn you are sending me from the United States is too late for sowing this year, as

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* An analysis by Dr. Waldie of Soil from the Orange grove, is given in Mr. Brownlow's paper.

May is the month in the Terai, it has not arrived yet, but when it does, I shall have it carefully dried and put into bottles for next year. The four cobs I sent you from this year's corps were partly grown on the same land as last year, and partly on new, and the only cultivation I gave it was that I thoroughly cleaned the land first for sowing and then hand-weeded it twice; nothing more was done to it."

Messrs. Lloyd & Co., are to be congratulated on the success of their experiment, and their coolies, no doubt, fully appreciate the fine quality of the seed thus placed at their disposal.

THE FRENCH OPEN-AIR SILO.

Mention has several times been made in the *Review* of the latest French idea in ensilage, that of simply building up the material in the open air and weighting it. A correspondent of a French agricultural journal describes his method of making a stack silo of green corn which we consider of sufficient interest to condense for our readers. Beams or sills are laid upon the ground at about a distance of two feet from each other, their length being according to the desired width of the silo and the number of beams according to the length desired. Each of these has a mortice near the end to receive the bottom of uprights, which pass through far enough to admit of an iron pin through a hole under the beam or sill. The corn fodder was laid crosswise on these beams, and built up as solidly as possible till the mass is built up. Boards are then laid on the top, uprights are placed in position in the mortices in the sills and secured by the pin underneath. A second set of beams morticed like the bottom ones are slipped over the top of the uprights which have holes for quite a distance down from the top for inserting a pin above the top beams. This, as will be seen, gives the mass of green fodder inside of the framework of sills, uprights and overhead beams. The pressure was produced by the common lifting jack, a pin through the top of the upright, forming one point of support and the top of the beam the other. As the jack is worked, the beam is pressed down upon the mass: when sufficient pressure is produced it is held in place by a pin slipped through a hole in the upright. Each beam on a side is treated in this manner, and then the opposite ends, bringing them down to a level. Pressure was applied in this manner daily for eighteen days, after that time only once a week. The ensilage was removed in sections, taking off one beam at a time and cutting down, leaving the pressure upon all the rest of the mass. The ensilage came out in a perfect state of preservation, with the exception of three or four inches around the sides which was black and mouldy. The silo thus described was a small one holding but 2½ tons. But the principle is just as applicable to larger masses, provided the requisite pressure can be obtained. Some improvements upon the above described plan suggest themselves, which we give: First, we would put the uprights in place before beginning to build the mass, staying them across the top to keep them at the proper distances, or the top beams could be slipped over the ends and held in place by a pin, the uprights being stayed to keep them in a perpendicular position. Then place boards inside the uprights, which would enable the packing of the outside much more solid than could otherwise be done. These boards could remain in place or be raised up as the filling proceeds, as in building a concrete wall. No mention is made of filling in with earth between the sills, but this should be done so as to leave no air space below. In regard to width of silo, for obvious reasons it should not be made very wide, not to exceed 6 feet, as a narrow one is more easily compressed than a wider one. No mention is made of the size of the timbers used for sills, uprights and beams. For the sills and beams they should not be less then 6×6 inches, and for uprights 2×6, though possibly 2×4 would answer. The hole in the bottom of the latter should be at least six inches from the end, and large enough to take a five-eighths or three-quarter inch iron pin. It would be well to put a three-eighths iron bolt through the bottom flatwise to strengthen it, as the strain upon it will be very great. From the description above given any farmer who wishes can experiment this fall on the French plan of an open-air silo at but little expense. The lifting jack or two of them would be essential for securing the pressure unless he can devise some other plan equally efficient for producing it. The success depends upon a sufficient amount of pressure being brought upon the mass. This might, perhaps, be obtained by the use of a chain and lever, a loop in one end of the chain being slipped around the end of the sill, and the other over the end of a lever, working over the top of the upper beam, the pressure gained being secured by inserting the pin in the holes of the upright, as the beam is forced down, and new purchase obtained by shortening the chain. With a silo not more than four feet wide, a leverage so worked might secure all the pressure needed. We do not assert that the result of such experiment would be entirely satisfactory, but it is one of those cases where the injunction of the apostle to the Gentiles is applicable: "Prove all things, hold fast to that which is good."—*Farmer's Review.*

GIGANTIC FLOWERS.

Certain localities seem particularly adapted for the development of both animals and plants, and in the region including India, the islands of the Indian Archipelago, and outlying Australia, certain forms of the latter are found. that in the size of their fruit and flowers, excite the greatest wonder in those who have beheld them, and not a little incredulity in those who have not been so fortunate. In the southern continent of our own hemisphere is found the great lily Victoria regia, that created the sensation of the time when discovered. The Victoria regia, however, is dwarfed by several flowers that have since been discovered, and, indeed, in South America there are one or two that equal, if not exceed it. The most wonderful discovery in plant life in recent times is a gigantic drum. It was found by Beccari in Sumatra, and the plant, which has been named *Amorpho phallus titanum*, has an ally in northern countries in the little "wake robin" common to English hedgerows. The Sumatra arum is a wake robin of mammoth proportions, and it is said that the first European that observed it at first refused to believe that it was a flower. This was before the time of Beccari, who brought the plant before the scientific world. A party was travelling through Sumatra with native guides, when one of the latter brought into camp a huge object of evidently vegetable structure, at least six feet in length, and endeavoured to make the white men believe that it was a flower, or part of one. The story, however, was not credited, and was forgotten until the real discovery was made by the Italian botanist mentioned. He found the plant growing in secluded parts of the country, and considered it to be a most remarkable example of vegetable growth. Imagine, if you can, a tuber five feet, and sometimes more in circumference; from this growing leaves on foot stalks, ten feet in length, divided and torn by the wind, yet covering an area of forty-five or fifty feet in circumference. Above this towered the gigantic flower, impressing the beholder not only with its size, but by its peculiar colouring. The central column or spadix, that in the wake robin, is used as a button-hole bouquet, is in this tropical cousin, six feet in height and proportionably stout. The spadix from which this rose was about three feet in diameter, of a bell shape, the edges richly crumpled and toothed in a fantastic manner, and coloured a pale greenish tint upon the inside and a rich, black metallic purple without. A group of these plants would present a remarkable sight, their enormous leaves, the large masses of colour and the huge waving central column resembling more the creatures of some vivid imagination than the reality. If we consider diamater, the discovery of Sir Samford Raffles in the same country is indeed a greater marvel. The plant now known as the *Rafflesia arnoldi* is an enormous parasite uncouth and fleshy, seemingly attaining its huge dimension by literally absorbing the juices of its neighbours. It is invariably found growing upon the roots of other plants, leafless, rootless itself, represented only by the gigantic flower, from which rises an odour sickening and fœtid in the extreme. The plan first observed was considered an enormous fungus or agaric, but it was soon shown to be a flower. Imagine a rose blasted and swollen, weighing fifteen or twenty pounds, its petals reduced to five in number, the thickness of each being over an inch, each one measuring a foot from the base to the apex, and some idea can be gained of this monstrosity of plants. It measured over three feet across the surface, and the nectary, a vessel capable of holding six quarts, was filled with a reeking fluid, that gave out an odour like tainted beef, and was a trap, containing the bodies of myriads of insect victims. The flower was first discovered on the Manna River, Sumatra, where it is known as the "Devil's Siri Box," and is calculated to create a decided impression on the mind of the observer. Dr. Arnold, after whom it is also named, says of the effect it had upon him when coming suddenly upon it—"To tell the truth, had I been alone, and had there been no witnesses, I should, I think, have been fearful of mentioning the dimensions of this flower, so much does it exceed every flower that I have ever seen or heard of." In the island of Java another of these giants has been found differing but little specifically, and being nearly as large as its Sumatra ally.—*Scientific American.*

FARMING IN AMERICA.

THE annual report of the American Department of Agriculture, just issued, has its special feature of interest in a very able paper entitled 'Agricultural Graphics,' by the Hon. J. R. Dodge, the famous statistician. It is fraught with facts and figures which cannot fail to interest people in this country, and especially the landowning and farming classes. Mr. Dodge's pictures of American farming not only show American themselves the progress they are making, but they show us also how it comes to pass that our English markets can be filled with American goods to the disadvantage of our own farmers, but to the advantage of our large and thick population. The facts given are instructive and curious.

It is curious to know, for instance, that the land surface of the United States makes an aggregate of 1,850,108,800 acres, exclusive of Indian territory and Alaska. Of this area 536,081,835 acres are in farms. The farm area of the United States has nearly doubled in thirty years, increasing from 293,560,614 to 536,081,835 acres. During the first ten years the taking up of Government lands in the west and south and the State lands of Texas was active. The most fertile areas, little encroached upon in the newer settlements, were taken possession of with a certainty of appreciation in value that added intensity to the pursuit of homes obtainable at insignificant prices. The absolutely free homestead had not at that time been guaranteed by law. In the next decade the disturbing element of civil war prevented aggregate increase, the States within the theatre of actual warfare declining in area, some farms being abandoned and hence not counted as farms. At the same time many of the Western States showed a considerable increase—Kansas, for instance, with 1,778,400 acres in 1860, had 5,656,879 in 1870. Between 1870 and 1880 the new lands taken into the farm area exceed 1 128,000,000 acres. Of this, no less than 49,000,000 were in divisions between the Mississippi and the Rocky Mountains. The increase was large in the south, specially in Texas, where it was nearly 18,000,000. The proportion of unimproved land, notwithstanding the new land taken up, has been constantly decreasing. It was 61·5 per cent in 1850, 59·0 in 1860, 53·7 in 1870, and 46·2 in 1880. The aggregates are :—

Years.	Farm Land.	Improved Land.
1850	293,560,614	113,032,614
1860	407,212,528	163,110,720
1870	407,735,041	188,921,099
1880	536,081,835	284,771,042

A very curious fact in relation to other industries is also shown and this is that values in agriculture are everywhere enhanced by the increase of the non-agricultural populations. Thus, where the agricultural population is 77 per cent of the whole, farms are only worth 5 dols. 18 cents per acre; where it is 58 per cent, farms are worth 13 dols. 53 cents per acre; where it is 42 per cent 30 dols. 55 cents per acre; and where only 18 per cent they go up to 38 dols. 65 cents per acre. Of course this was a result only to be expected, but still the figures put the subject in a very pertinent and striking manner. The above figures are averages for groups of States, but it may be added that values of farms are as low as 4 dols. 19 cents per acre in Alabama, where there is an agricultural population of 77 per cent, and as high as 200 dols 18 cents per acre in the district of Columbia, where only 2 per cent of the population are engaged in agriculture.

Similar influences are at work also in reference to wages for agricultural labourers, and these wages per month are given. As this is a matter of great interest to those who may be thinking of leaving this country for the United States, we give these wages for 1879 and 1882 :—

Group of States.	1879.					1882.				
	$	c.	£	s.	d.	$	c.	£	s.	d.
California ...	41	0	8	4	0	38	25	7	15	0½
Eastern States ...	20	21	4	0	10½	26	61	5	6	6½
Middle States ...	19	69	3	18	10½	22	24	4	10	0
Western States ...	20	38	4	1	7	23	63	4	14	7½
Southern States...	[illegible]	31	2	13	3½	15	30	3	1	3

In this table the dollar is turned into English money at 4s. to the dollar and a half-penny to the cent.

The total value of farm animals is shown to be 2,467,859,924 dols., and of this 44·6 per cent represents that of cattle, 32·8 per cent of horses, 10 per cent of swine, 6·6 per cent of mules; and 4·9 per cent of sheep.

Other diagrams deal with the wheat industry, and one of these shows that the principal wheat region of the country is the Ohio Valley, and not the North-West or the Pacific States. This is a fact not generally appreciated. The difference in rate of yield of the States and Territories in 1879 is shown. The Ohio Valley makes the largest yields, New England about the same as the Pacific coast, and the spring-wheat region much less. The average rate of yield is small in the south, though there are instances of very heavy yields, indicating the possibilities of certain soils in that region from wheat production :—

States.	Yield per Acre. Bushels.	States.	Yield per Acre. Bushels.
Maine	15·2	Texas	6·8
New Hampshire ...	15·0	Arkansas ...	8·2
Vermont ...	16·3	Tennessee ...	8·1
Massachusetts ...	16·4	West Virginia ...	10·2
Rhode Island ...	14·1	Kentucky ...	9·8
Connecticut ...	17·6	Ohio	18·0
New York ...	15·7	Michigan ...	19·5
New Jersey ...	12·7	Indiana ...	18·0
Pennsylvania ...	13·5	Illinois... ...	15·2
Delaware ...	13·4	Wisconsin ...	12·8
Maryland ...	14·1	Minnesota ...	11·4
Virginia... ...	8·7	Iowa ...	10·2
North Carolina ...	5·2	Missouri ...	12·0
South Carolina ...	5·6	Kansas... ...	9·3
Georgia	6·6	Nebraska ...	9·4
Florida	5·2	California ...	22·0
Alabama ...	5·7	Oregon ...	15·8
Mississippi ...	5·0	Nevada ...	16·8
Louisiana ...	3·4	Colorado ...	18·9

The production of wheat per head shows also some curious facts. In Louisiana this is little more than half a pint, while in Minnesota it goes up to no less than 44 bushels. On this subject some most instructive statistics are given, comparing the figures for the United States with those for European countries. On this subject Mr. Dodge says :—'Russia, the principal competitor of this country in wheat exportation, has only 2·1 bushels per head, while the United States had 9·2 in 1879, the census year. The reason is Russia exports wheat and eats but little of it, using rye instead. Germany has the same relative supply, and she uses rye rather than wheat for bread. Hungary, France, and Spain stand in the front rank as to supply per head.' The following table shows the quantity produced, the population, and rate of supply in the States of Europe :—

Countries.	Wheat.	Per head.	Population.
	Bushels.		
Austria	44,543,126	2·0	22,316,507
Hungary	131,746,878	8·4	15,642,102
Belgium	24,900,030	4·5	5,585,846
Denmark	3,102,821	1·5	2,018,432
France	294,400,346	7·8	37,672,048
Germany	93,823,048	2·1	45,213,207
Great Britain ...	82,265,783	2·7	30,192,220
Ireland	3,674,155	0·8	5,097,730
Greece	4 370,649	2 8	1,560,000
Italy	155,012,168	5·4	28,459,451
Netherlands	5,439,533	1·3	4,172,971
Portugal	7,579,088	1·9	3,996,163
Roumania	25,000,000	4·7	5,376,000
Russia	171,369,856	2·1	83,000,349
Servia	4,086,720	3·3	1,250,000
Spain	117,563,372	7·3	16,000,000
Sweden	3,106,779	0·7	4,579,115
Norway	284,703	0·2	1,818,853
Switzerland	2,145,526	0·8	2,669,138
Turkey	40,867,200	4·2	9,800,000
Total for Europe ...	1,215,609,783	3·7	327,020,132
Total for U. S. ...	459,483,187	9·2	50,155,783

A most interesting series of diagrams is also given showing the production of maize, which proves that this is far in excess of wheat, though the exports are not so large. Thus, in 1882 the production of maize amounted to 1,551,066,895 bushels, of which

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86,268,606 were exported. Of wheat 421,086,160 bushels were grown, and of these 111,534,182 bushels were exported. Of all cereals the following are the productions and exportations —

	Production.	Exports.
	Bushels.	Bushels.
Maize	1,754,591,676	99,572,329
Wheat	459,483,137	180,304,180
Oats	407,858,999	760 366
Barley	43,097,495	1,128,923
Rye	19,831,595	2,930,109
Buck wheat	11,817,327	

The year for which these figures are given is not stated. The production of all cereals per head of the population is given for Europe and the United States. The European average is 16 1 bushels per head; that of the United States amounts to as much as 53·8 bushels. In Great Britain it is 9 5 bushels per head. The use of corn in America in place of roots and forage crops in the feeding of farm animals makes the disparity less than it appears; but even making allowance for this, the figures show that that country has an unprecedented supply for the sustenance of man and beast —*North British Agriculturist.*

IMPORTANCE OF INSECTS, ESPECIALLY BEES, TO FRUIT PRODUCTION.

THE following extract from an address on this subject by Frank R. Cheshire, of South Kensington, London, England, will be read with much interest and profit by all fruit growers —

" Blooms are produced by plants in order that seeds may follow, and so the race be continued. Two parts are essential to this reproduction—the anther and the pistil, the latter very generally occupying the central position. The anther is usually a double-celled pouch, the contents of which by segmentation breaks up into a number of perfectly similar parts called pollen grains, which, though minute, are complex in structure. When these are mature, the anther splits or dehisces, and the pollen escapes, but it needs in some way to be applied to the termination of the pistil called the stigma. When this application is effected, the pollen grains absorb moisture, its interior portion swells, and actually throws out a tube, which often grows to a great length in making its way towards the unimpregnated nucleus of the ovule which is situated in the ovary at the base of the pistil. In this nucleus a large cavity filled with protoplasm has developed called the mother cell, within which we find the embryonal vesicle to which the contents of the pollen grain is transferred by the channel of the pollen tube. This is fertilization, and upon it depends the production of seed, for the new individual plant has its beginnings from this interfusion.

" An examination of most blooms will show that the essential organs before referred to are so placed that an accidental or unaided transfer of pollen to stigma is unlikely, and where this arrangement of parts is not found, it frequently occurs that the anthers ripen and dehisce much before, or not until some time after the stigma has so matured as to be ready for pollination. In the former case, as we may observe in the common garden, Nasturtium (*Tropæolum majus*), the pollen is all carried away by insects by the time the stigma presents itself, so that if fertilization be effected, it must be through the bringing of pollen from other blooms still shedding it. Insects are the means which accomplish this, and to secure their visits, the blooms spread them a banquet.

" The apple is called by the botanist a pseudo syncarpous fruit, because it may be regarded as five fruits gathered into a unit by an envelope formed by a development of the calyx. If an apple be cut across, we see five compartments or dissepiments in the core, each one of which should contain pips or seeds. The bloom which preceded the fruit had five stigmas, each one of which communicated with a dissepiment and required an independent fertilization. Bees seeking honey would by getting their breasts (furnished as they are with abundance of long webbed hairs), thoroughly dusted with apple pollen, and flitting to a bloom whose stigmata had reached the receptive condition, bring about fertilization. It would, however, frequently happen that three or four of the stigma only would be pollinated. In this case an apple, though an imperfect one, would be produced. Trees, agitated by the winds, frequently drop a quantity of their fruits, hence known as windfalls, but the actual cause of this dropping is in by far the largest number of instances defective fertilization.

" In an examination made some time since of a large number of windfalls, less than 1 per cent were found to have fallen through injuries traceable to insect pests, while the remainder had received pollination in from one to four dissepiments only.

" Fertilization is followed by a determination of nutrition towards the seeds, and the parenchyma of the apple as a protective envelope gathers around them. If, therefore, we cut a defective fertilized apple across the middle, we find a hollow shrunken side lying over the unfertilized portion of the core. These facts taken together, show conclusively how completely our apple crop is dependent upon insect agency, and amongst these the hive bee takes the most important place.

" In the case of the strawberry, the parts popularly denominated seeds, which crowd its surface are really the fruits technically called achenia, while the strawberry itself is really a succulent development from the flower stalk. The stigma each of the achenia carries must be fertilized by insects which are attracted by the honey secreted by a ring of glands situate at the base of the strawberry. The anthers are wide set, and as the insect walks around the bloom applying its tongue to the circle of glands, one side of its body is dusted with pollen from the anthers, while the other is applied to the stigmatic faces. In passing from bloom to bloom, it frequently reverses the order of its progression, sometimes going around, by turning to the right, and sometimes to the left, as a result the pollen gathered upon one side of the body is probably transferred to the stigmas of the next flower visited. As in the case of the apple so here, fertilization determines nutrition The placentæ of the fertilized achenia increase enormously, the strawberry grows and matures, but where any of the stigmas escape impregnation, there the strawberry remains without growth, while the other parts are rapidly increasing around it. (Is not this the cause of knotty berries?—ED., *F. R.*) The examination of a few fruits would be sure to supply examples where in circumscribed spots, no progress has been made since the first full expansion of the bloom. The achenia are close set and green, and the flesh of the strawberry is there crude and hard, while the rest is sweet, soft, and luscious. Imperfect insect work is again the explanation, bringing before us the remarkable fact that no perfect strawberry can be produced without, perhaps, from three to four hundred independent fertilizations, accomplished, it may be, by the busy hive bee, which, in filling the niche in which the Great Creator has placed it, in unselfishly laboring in providing for the wants of its younger sisters, is unconsciously supplying to its master not honey only, but honey and fruit.

" The raspberry, although of another type, somewhat resembles the strawberry in the multiplicity of his stigmas (60 or 70 to each bloom), the wide setting of its anthers (about 80 or 90 in number) and its circle of honey glands. Similarly, too, the insect visitor in seeking nectar, passes between the anthers and stigmas, applying its right side to one and its left side to the other. Each seed fertilized by these visits is soon surrounded by a luscious envelope which protects the seed from injury and makes the manufacture of raspberry jam a possibility. These rounded red masses, with their enclosed seeds, technically called drupels, and never formed unless fertilization has taken place, neither ripening or growing being possible in its absence. We see, then, in an aspect which may be new to many of us, that this wondrous scheme of nature has correlations which we never could have anticipated; that a large part of the insect world is complementary to plant life, and plants in turn the sustainers of these insects, and that man, although he can plant his trees, is in no small measure dependent for a crop upon the assistance of those little laborers, which, by their unconquerable industry, supplied his table with sweets for long ages before he discovered the uses of the sugar cane."—*Farmer's Review.*

THE VALUE OF SULPHATE OF AMMONIA AS A MANURE.

By Mr. F. J. Lloyd, F.C.S., Lecturer on Agriculture at King's College, &c, London.

WRITING to the *Journal of Gas Lighting*, Mr. Lloyd, F.C S., says:—Of late the *Journal* has contained some interesting matter in reference to sulphate of ammonia. Perhaps, therefore, a few words on this subject from an agricultural point of view might not only prove of interest to its readers, but, while dispelling from their minds the false views regarding the nature of this product, enable them to rightly estimate the true relative merits of nitrate of soda and sulphate of ammonia as manures. Each of these substances has a manurial value; and both owe this value to the same fact—viz., that they contain nitrogen. In the one the nitrogen exists combined with hydrogen as ammonia; in the other, combined with oxygen as nitric acid. It is a well-known fact that 100 parts of commercial sulphate of ammonia, of 94 refraction, such as is now usually sold for manurial purposes, contains about 20 parts or more of nitrogen; while the detrimental impurities, the various cyanides, which used twelve or more years ago to be somewhat prevalent in sulphates of ammonia, are now seldom met with. On the other hand, commercial nitrate of soda, of 95 refraction, contains little less than 16 parts of nitrogen. Hence, unless it can be shown that the nitrogen in sulphate as ammonia is less valuable to the farmer than the nitrogen in nitrate of soda, it is evident that, so long as a ton of nitrate of soda can be bought for £10 (which is approximately its present price), sulphate of ammonia is worth £12-10s. a ton. Now, is the nitrogen of ammonia as valuable to the farmer as the nitrogen of nitrate? In order to answer this question, which lies at the root of the whole subject, it is necessary to briefly state some facts regarding the function of the roots of the plant, and the properties of the soil. The majority of plants take most, if not all, their nitrogen from the soil as nitric acid. There can be no doubt, therefore, that nitrate of soda will act upon vegetation more rapidly than sulphate of ammonia. But it is equally certain that every properly cultivated soil possesses to a high degree the power of nitrification—that is, it converts all nitrogenous substances gradually into nitric acid. Ammonia is one of the substances most easily so converted. Hence it is certain that, when sulphate of ammonia is used as a manure, the soil will gradually convert the ammonia into nitric acid, and supply to the plant nitrogen really in the very same form as is supplied by nitrate of soda. So far it is evident, then, that nitrate of soda is only more beneficial than sulphate of ammonia, inasmuch as it acts upon vegetation more rapidly.

Next let us consider the action of the soil on these two substances respectively. The late Dr. Voelcker, among his valuable additions to agricultural chemistry, left none more valuable than his researches upon the action of soils on manures. By analysing the water flowing from the drains of large fields, where crops were cultivated under varying conditions and manures, he proved that nitrate of soda is washed rapidly through the soil by rain—so that a large quantity of the nitrogen so applied to the soil is never taken up by the roots of the plants; and during the time there is no crop growing, the nitrate of soda is being merely washed away. Not so with sulphate of ammonia. Only once or twice, in all his experiments, did he find ammonia being washed through the soil into the drains, and then only in minute quantities, and this was found to be the case even where the land had been manured with 4 or 5 cwt. of sulphate of ammonia—far larger quantities than are usually employed. What, then, became of the ammonia? It was found that all fertile soils had the power of retaining ammonia, which became only gradually converted into nitric acid; and then only, and not until then, was it washed out of the soil. Meanwhile, any plant growing in the soil, would be well able to take up the nitric acid as it was formed, so that less would be lost, than where the nitrogen had been applied as nitrate of soda. If, then, nitrate of soda is more active than sulphate of ammonia, still the latter is more lasting and less wasteful. It is evident that manure manufacturers are well aware of this fact, for one seldom finds nitrate of soda admixed in compound manures, except for special and forcing purposes, while sulphate of ammonia is largely and rightly used for mixing with phosphatic manures. If I have made my meaning clear, it will be evident that the producers of sulphate of ammonia have nothing to fear, from theoretical reasons, as to the supposed inferiority of this manure, when compared with nitrate of soda.

As might be anticipated, practice in the field confirms these scientific conclusions. Thus the renowned experiments of Sir J. B. Lawes and Dr. Gilbert at Rothamsted, and the experiments by the late Dr. Voelcker at Woburn, for the Royal Agricultural Society, yielded the following results, where equal quantities of nitrogen were applied as sulphate of ammonia and nitrate of soda respectively:—

	Rothamsted.		Woburn.	
	Barley.	Wheat.	Barley.	Wheat.
Sulphate of Ammonia—				
Bushels	42⅞	31¾	41·2	29·1
Weight per bushel (lbs.) ...	45⅝	60¾	52·4	57·1
Nitrate of Soda—				
Bushels	45	37½	42·6	28·9
Weight per bushel (lbs.) ...	48	59	52·3	56·9
	Aver. of 13 yrs.		Aver. of 6 yrs.	

At Rothamsted the ammonia salts were applied in the autumn; but at Woburn in the spring. In both cases the nitrate was applied in the spring; and it is evident that there is an apparent superiority of nitrate of soda over sulphate of ammonia (and chlorides, for they were mixed) at Rothamsted. I have, however, brought forward these results because they illustrate very forcibly how much the value of a manure (and especially a manure like sulphate of ammonia) depends upon the time of its application. Undoubtedly the best time to apply sulphate of ammonia is in the spring—early spring—and in damp weather. And this is why the Woburn experiments yield more favourable results. Had the nitrate of soda at Rothamsted been applied in the autumn, it would have been largely washed out of the soil, and proved useless; and then the sulphate of ammonia would probably have yielded much larger crops than the nitrate. The fact that the sulphate remained in the land all through the winter, and produced a crop very nearly as good as the nitrate applied in spring, is a strong proof of its great value as a manure. In fact, the only legitimate conclusion which can be drawn from the preceding is that the nitrogen in sulphate of ammonia is every whit as valuable as the nitrogen in nitrate, provided the sulphate be properly used. But there is another advantage possessed by sulphate of ammonia, as opposed to a direct disadvantage under which nitrate of soda labours. It is this: Nitrate of soda will often prove of more harm than good on stiff clay soils; while on such soils, sulphate of ammonia proves a most valuable manure. Indeed, there is no soil upon which sulphate of ammonia has proved to have any injurious effect; while there is evidence of farmers having found nitrate of soda injurious on their wet stiff clays.

It must not be supposed for a moment that in upholding the value of sulphate of ammonia, I wish to detract from the value of nitrate of soda. Each has its proper use; and each to give good results, requires care and judgment in its use. There are circumstances and conditions when, as shown, sulphate of ammonia is superior to nitrate of soda; but there are equally circumstances and conditions, when nitrate of soda is superior to sulphate of ammonia. This, however, is not the place to enter into the conditions. All that I wish to point out to gas companies and sulphate of ammonia manufacturers is this—that sulphate of ammonia is most valuable as a manure, and can be applied in the majority of cases with as great advantage as nitrate of soda. The unit value of nitrogen therefore in these two substances is (for the farmer) identical; so that the price of sulphate can never be above that of nitrate of soda, except in so far as it contains 20 parts of nitrogen to 16 parts in nitrate of soda, and the market value of these two articles must regulate one another.

But the question of demand must be taken into account; into the supply of sulphate we need not inquire. What the manufacturers want is to create—or rather to increase—the demand. Those interested in nitrate of soda have already realised the importance of this; and hence, no doubt, the tempting bait of £500 which has been offered for the best essay on its advantages. That this essay will be in strict accordance with scientific and proved facts is certain from the names of those who have been selected as judges. Hence it will carry great weight and conviction; and the impetus which will be given, not only in England, but throughout the world, to the use of nitrate of soda as a manure, will be immense. Some twelve months at least must elapse before the prize essay can be published; and the producers of sulphate of ammonia will have none but themselves to blame if they refuse to utilise the interim in making more widely known the advantages of sulphate of ammonia as a manure—advantages which are as real, and as well proved, as any of those which can be brought forward in favour of nitrate of soda.—*North British Agriculturist.*

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

The disease commences with a slight derangement of the stomach, but if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions, he will be able to determine whether he himself is one of the afflicted:—Have I distress, pain, or difficulty in breathing after eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste? Is the tongue coated? Are there pains in the sides and back? Is there a fullness about the right side as if the liver were enlarging? Is there costiveness? Is there vertigo or dizziness when rising suddenly from a horizontal position? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach? Is there frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one of long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty, brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As

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Health, Crop and Weather Report.

[FOR THE WEEK ENDING 23RD SEPTEMBER 1885.]

Madras.—General prospects fair, much improved in Bellary and Anantapore under the recent heavy rains.

Bombay.—Good rain throughout the Deccan and Southern Mahratta Country. Condition of crops and grazing much improved by it, more rain urgently needed in most districts of Guzerat and in parts of Tanna and Colaba. Preparations for *rabi* crops commenced in parts of Nasik, Bijapore, Belgaum, and Broach. Standing crops injured by rats and storms in parts of Hyderabad. Cholera in parts of fifteen; fever in parts of twelve; and cattle-disease in parts of nine districts.

Bengal.—Rain in almost all districts, but generally not so much as in previous weeks. The comparative cessation of rain has been very beneficial to all crops. *Bhadoi* harvest is proceeding, and late rice crop on lands not inundated is doing excellently. Floods have done more or less damage in many places, particularly in parts of the Burdwan and Presidency Divisions. Price of rice generally continues high. Fever is beginning to be prevalent in some districts, but general health, on the whole, is fair.

N.-W. Provinces and Oudh.—A slight sprinkling of rain in some places; more is needed in other places both for rice crops and *rabi* sowings. General prospects are, however, good. Cholera generally abating; fever prevails in places, as also cattle-disease, but general health continues good.

Punjab.—Slight rain. Health and *kharif* prospects generally good. *Rabi* operations commenced in the south east. Prices stationary.

Central Provinces.—There has been a good fall of rain in the districts in which it was most wanted, and prospects have much improved, but more rain is required. Rice on high land in the Chuttisgurh division has been damaged by lack of moisture, and is reported to have been ruined in Sambulpore.

British Burmah.—(19th September).—Cholera slight in six districts, elsewhere public health good, cattle disease slight in eleven districts, elsewhere health of cattle good. Transplanting nearly completed. Rains seasonable.

Assam.—Weather fair in Gowhatty. Fever very prevalent, *kalajar* still in Luki circle, cattle disease reported from some mouzahs. Transplantation of *sali dhan* nearly finished. Prospects of all crops good. Whole country flooded more or less in Sylhet. *Aus* paddy much damaged, also *sali*; injury to *aman* apprehended. Much mortality in south Sylhet and Habiganj from fever. Transplanting of *sali* and reaping of *aus* crops progressing in Cachar; prospects of tea good. *Mati kalai* being sown in Debrugurh where the prospects of tea and other crops good.

Mysore and Coorg.—Standing crops are said to have improved but more rain at an early date is urgently required throughout the State. Outturn of *juari* and *daragu* in Tumkoor poor. Agricultural operations reported from some places. Prospects of season slightly improved, except in northern Tumkoor, where reported indifferent, and in Chitaldroog reported bad. In Maidan taluks of Shimoga and Kadur prospects said to be unfavourable, except in the case of the Nagur taluk. The fall of rain in these two districts on the 12th and 13th instant nowhere exceeded two-thirds of an inch, and was, for the most part, insignificant. Drinking-water procurable, but scanty, pasturage on the whole increasing. Cattle continue in poor condition. Prices not materially altered, except in Shimoga, where they are said to be rising rapidly. Public health good; no cholera deaths reported for the week. Crops in good condition in Mercara. Picking of cardamom crop commenced. Prices of food-grains slightly risen. Prospects of season and public health good.

Berar and Hyderabad.—The rainfall of the week has been beneficial to the crops. Wheat 22 and *juari* 26 seers per rupee. More rain wanted in parts of the districts, and urgently in Akote and Jalgaon talukas. Crops generally doing well. Cholera has disappeared from Patlur taluka. Price—wheat 12½, coarse rice 12½, white *juari* 18, yellow *juari* 21½, and tur 15 seers per [illegible] rupee.

Central India States.—Weather cloudy, but cooler; more rain required urgently throughout. Fever still in Mhow and among [illegible]. Prospects good. Cholera continues in parts of Rewah State. Health fair otherwise. Prices stationary.

Rajputana.—Tanks, wells, health, and crops good. Weather fair and warm; clouds towards evenings with short heavy showers. Jodhpore city tanks all full, wells filling up. Generally crops needing rains; rain fell more or less in north eastern districts. Crops likely to suffer where rains are delayed. Prices tending to rise in some parts, stationary otherwise.

Nepal.—Weather getting cold. Prospects good.

Editorial Notes.

WE notice that a survey of the whole district of Tanjore has been sanctioned. The deltaic tracts are to take precedence of that of the other portions of the district.

⁂

THE latest reports from the various tea districts are not favourable on the whole, especially those from Sylhet, where very heavy rain has fallen. In Assam the weather has been wet and cold, and many of the gardens of this district are considerably behind in their outturn.

⁂

IT is said that the receipts of the American crop at the ports keep comparatively small, and American spinners have evidently been taking a large proportion of the supplies, so shipments to Europe are light. Of these, moreover, the Continent is taking a much larger proportion than last season, a feature which is not unlikely to have an important effect on Liverpool later on.

⁂

THE Kent county authorities have received information of a serious outbreak of pleuro-pneumonia in the Sittingbourne division. The disease has affected a herd of dairy cows; one has died, and another has been ordered to be slaughtered. The place is declared an infected area under the Contagious Diseases Animals Act.

⁂

"BUTTER by electricity" reads novel, but such is, nevertheless, the latest application of this subtle fluid. We are told that recently electrodes connected with a dynamo of the power of 40 ordinary Daniell cells were put into 45 gallons of fresh milk, and in exactly 4½ minutes butter was produced. The quantity obtained was fully equal to that procured in the ordinary way, and the quality perfect.

⁂

"THUS far," says the *Farmers' Review* in a recent issue, "the evidence before the *British Ensilage Commission* has been entirely favourable to the use of ensilage, especially for dairy cows. Dr. Voelcker candidly conceded in his evidence that little practical dependence can be placed upon chemical analyses for the feeding of animals. He believes that food may be ever so good, yet, if the animal does not like it, it will not make good meat. From the high attainments of this witness, it will be well for some of our chemists to bear his evidence in mind."

⁂

THE Acting Collector of Trichinopoly, referring to our issue of the 11th July last, at page 327 of which was published a method for the destruction of cocoanut-borers, enquires the extent of the "beegah" therein referred to, in square yards. The "beegah" varies in almost every district, so that no hard-and-fast rule can be laid down by which the exact measurements of a "beegah" can be ascertained. That, however, referred to in our issue of 11th July last, is intended to mean a *Bengal beegah*, which is equal to 1,600 square yards: 3½ Bengal beegahs being equal to one acre.

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IN connection with the tenth annual Dairy Show, to be held at the Agricultural Hall, Islington, early next month, there will be a conference on October 7th, at which papers will be read and discussed on several dairy questions. Sir John Lawes, Bart., will contribute one "On the necessity for some change in the Law in regard to the Adulteration of Milk;" and Professor Fream, of the College of Agriculture, will read one on the subject of "Milk Registers." The list of prizes for competition amounts to nearly 2,000l., and embraces every kind of dairy cattle, produce, utensils, vehicles, appliances, &c. The Show is under the control of the British Dairy Farmers' Association, which, under the presidency of Lord Vernon, has enrolled about 200 new members since the last Show.

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WE learn from one of our exchanges that the agricultural returns for Great Britain, which have just been issued from the Agricultural Department of the Privy Council Office, show that the acreage of land under wheat has decreased during the last twelve months by over 11 per cent, while the acreage under barley has increased by 4 per cent, and there is a slight increase in the acreage under oats. The number of cattle in Great Britain has increased by 5 per cent in the twelve months, and the number of sheep and lambs has increased by something over 1 per cent, but the number of pigs has fallen off by 7 per cent.

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OWING to the lateness of the season, indigo manufacture is not expected to close in Behar until about the end of last month. The results will probably be less favourable than were anticipated, as the produce from the second cuttings has been bad. The nearest approach to an estimate of the crops yet made puts it down as between 52,000 and 53,000 maunds, of which about 12,000 are *khoonties*. The reports from Benares and the North-West Provinces are growing worse. Very serious damage has been done to the crop by the late heavy rain, and, though the weather has now improved, it is too late to be of much use. It is expected that the yield of these districts will fall very far short of that of last year.

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A CONTEMPORARY informs us that in connection with the attempt to ascertain the commercial value of the products of the *babul* tree, Government have directed further and more systematic experiments than hitherto to be carried out to ascertain the average outturn of bark and pods, and steps are to be taken to ascertain the areas of *babul* trees sufficiently near to one another to render it likely that it can be worked with advantage. From experiments hitherto made, it has been roughly estimated that the average outturn per tree of pods, with the seeds removed, would be about 50 lbs., and that of dry bark about 125 lbs.

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WE understand that the Ahmedabad Horse Show of this year was very successful. The total number of animals exhibited was 619, as compared with 603 in the preceding year, and more than a fourth of this number were the produce of Government stallions. A marked improvement was also noticed in the general condition of the brood mares and the young stock exhibited. It is incidentally mentioned that this part of the Bombay presidency has been swept clear of every decent animal between 12-2 and 14 hands for baggage ponies and other requirements for Quetta. Fortunately no mares have been bought, and as these are still in the country, the Government is urged to avail itself of this exceptionally favourable opportunity of improving the stock by purchasing six more stallions. Otherwise northern Guzerat will not on another occasion be able to supply the animals that have lately been forwarded to Bombay. The Bombay Government has given instructions for carry[illegible]bove proposal.

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A SOUTHERN India contemporary says:—"We are glad to note that our local Forest officers have taken a new departure, and instead of the inevitable blue-gum to which they have hitherto confined their planting operations, are now planting a very ornamental and æsthetic-looking tree whose botanical name we are not sufficiently happy to possess. Many thousands of these plants may be seen growing luxuriantly in the vicinity of the Aramby plantation, and form a pretty contrast to the adjacent sombre-hued eucalyptus trees. The [illegible] tenacity with which the Forest Department clung to the cultivation of blue-gums, has become proverbial, and it is a decided relief to see the monotony of blue-gum groves agreeably broken by trees of other varieties." The tree referred to is probably the Australian Wattle.

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THE Prussian Statistical Department has just issued an important report on the harvest prospects of the kingdom of Prussia, founded upon information about every district collected through the local agricultural societies. Assuming 100 as a representative figure of an average harvest or crop, the following is the estimate for the whole kingdom:—Wheat, 93 per cent; rye, 91; barley, 93; oats, 91; beans and peas, 93; potatoes, 98; turnips, rape, &c., 92; clover, 92; meadow hay, 98. East and West Prussia and the Rhineland seem to have the best prospects; Silesia and Brandenburg are at the lower end of the scale. The best wheat harvest is in the province of East Prussia; rye in the Rhineland; barley in West Prussia, Saxony, and Rhineland; oats in West Prussia; beans, &c., in Schleswig-Holstein; turnips, &c., in the Rhineland; and clover and hay in Hanover.

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THE Shevaroy Planters' Association addressed a memorial to the Government of Madras, praying that Government assessment on all estates on the Shevaroy Hills be remitted for one year, as owing to a succession of bad seasons, the ravages of leaf disease, and the continued depression of the coffee market, the planting enterprise on these hills has come to be in a critical condition. The Association made out a very strong case for Government concession, but with very little success, as the Collector of Salem did not support the application, beyond recommending six months' grace for the collection of the Government *kist* from those planters who have been very seriously affected by the failure of Messrs. Stanes and Co. The Government of Madras, while sanctioning such postponement, have decided that, in the case of the proprietors "hopelessly involved," there can be no object in postponing the demand. They are not prepared to go further than this, nor to direct a general suspension of collections irrespective of individual circumstances.

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Iron tells us that at a lecture on coal recently delivered at Philadelphia, it was stated by the author that the United States have an area of 440,000 square miles of coal-fields; 100,000,000 tons of coal were mined in the country last year, enough to run a ring around the earth at the equator 5½ feet wide and 5½ feet thick, and there is enough coal in the United States to supply the whole world for a period of 1,500 to 2,000 years. The question of the exhaustion of the coal supply, therefore, is not immediately important. The anthracite coal in Pennsylvania, it is stated, will last 250 years, while the bituminous coal in the same district will supply the world for fifty-seven years, and the United States for 350 years. The same lecturer stated that it took a prodigious amount of vegetable matter to form a layer of coal; that it was estimated that the present growth of the world would make a layer only one-eighth of an inch thick, and that it would take a million of years to form a coal bed 100 feet thick.

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MESSRS. CHABRIERES and Co., of Lyons, writing on August 7th, 1885, take the following view of the Lyons silk trade:—

As is usual at this time of year—a period between seasons—business drags along somewhat slowly, and we have to report a dull market for most classes of silk during the past month. The improvement produced on Europeans by the deficit in the Italian crop has been maintained, but without further development. The market for these sorts is now extremely quiet, and some [illegible] already show a certain impatience to sell. With regard to Chinas, the very reduced scale of shipments from Shanghai has enabled holders to obtain a slight further advance. Meantime, [illegible] seem determined not to buy beyond their daily wants, owing to the still very limited consumption of China [illegible], to which they have to look for guidance in their operations. In Canton, [illegible] and Japans, business has been very dull. Canton filatures, on the contrary, have enjoyed a regular inquiry at former prices. On the piece-goods market, the demand is still for mixed articles and cheap class goods. This explains why the activity on the looms is not productive of a brisker inquiry for silk ; and it seems as though a return of fashion to pure silks could alone bring a permanent revival on the raw material.

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The following statistics of the imports of dairy produce into England, we take from the *North British Agriculturist* :—

According to the B Bill of entry, we imported 198,212 cwt. of butter and butterine in July, against 185,607 cwt. in the same month of last year. As much as 79,277 cwt. was received from Holland, against 82,119 cwt., while France contributed 38,779 cwt. against 43,670 cwt., Sweden 10,389 cwt. against 9,667 cwt., Germany 16,015 cwt. against 8,102 cwt., and the United States (Atlantic) 14,711 cwt. against 5,802 cwt. Of the above total London received 25,200 cwt. against 22,680 cwt., Grimsby 12,065 cwt. against 19,941 cwt., Harwich 14,913 cwt. against 16,275 cwt., Hull 25,073 cwt. against 20,071 cwt., Newcastle 29,889 cwt. against 24,125 cwt., Southampton 27,293 cwt. against 27,671 cwt., and Leith 21,829 cwt. against 17,528 cwt. Our imports of cheese for the month came to 340,364 cwt. against 358,345 cwt. Holland sent 37,083 cwt. against 30,663 cwt., Canada 136,230 cwt. against 128,818 cwt. and the United States 163,826 cwt. against 195,652 cwt. The quantity landed at London was 15,555 cwt. against 14,855 cwt., Liverpool 187,620 cwt. against 249,379 cwt., Bristol 38,022 cwt. against 23,818 cwt., and Glasgow 61,776 cwt. against 48,741 cwt. During the same month the eggs we imported amounted to 646,464 great hundreds against 642,849 great hundreds. All the subjoined figures represent great hundreds, our chief sources of supply being France 323,775 against 299,833, Germany 144,361 against 158,189, Belgium 130,994 against 135,350, and Denmark 30,179 against 44,199 ; while Newhaven received 136,469 against 105,788, Harwich 131,084 against 125,450, Southampton 119,840 against 110,331, London 55,938 against 47,500, Grimsby 37,724 against 30,224, Hartlepool 85,716 against 100,344, Newcastle 43,265 against 45,451, Weymouth 293 against 33,906, and Leith 5,424 against 10,644.

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Dr. Trimen, Director of the Royal Botanical Gardens, Peradeniya, in reply to the request of the Madras Government for detailed information regarding his method of drying and preparing leaves of the *Erythroxylon Coca*, has sent the following reply :—

I have prepared a single small sample only of coca leaves from trees in this garden. This was in February last during the hot dry weather. No special precautions were taken. Fully grown leaves were carefully picked and at once dried gradually in the air under the shade of a verandah, the process being finished off in the sun. The complete drying took ten or eleven days, and the leaves lost half their weight in the process. When finished the leaves were flat, greyish-green and mostly unbroken, forming a good-looking sample. I am not aware whether the plan followed is the best that might be employed ; possibly more rapid drying would be found preferable. A sample packed in a tin-box was sent home, and on analysis by Mr. D. Howard was found to contain 0·22 per cent of pure cocain, a fair but not large proportion. I published this result in the Ceylon newspapers on 10th April last.

I understand that some analyses of the *young* leaves have been recently made by Mr. Hooper, the Government Chemist at Ootacamund, and I should feel obliged if you would request the Madras Government to furnish you with the result of these assays for our information here.

We have not seen Mr. Hooper's report of his analysis, but should like to.

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A few months ago we had occasion to notice the formation of an Agri-Horticultural Society at Nursapore in the Southern Presidency. The Society had asked for two acres of rent-free land, or at a nominal assessment. Sanction to this had been deferred pending the opinion of the Agricultural Reporter to Government. This has now been received ; and Mr. Benson, while he thinks the proposals referred to him are "hazy and indistinct," yet considers that Native gentlemen, who show a disposition to form societies for the promotion of agricultural enterprise and improvements, should meet with every encouragement from Government ; as, if we can enlist a genuine interest of this sort in the work of our department, it will be lightened, and its effect vastly increased.

He adds at the same time, that though it is impossible that anything real can be done in the way of farming on so small an area as two acres, still that the formation of an agri-horticultural garden of that size at Nursapore is likely to be beneficial, and worthy of assistance to a degree even more than asked for in the papers referred for his opinion. He considers that the Agricultural Department would be better able to judge whether Government assistance should be continued to the society than any other authority, and control in this respect might be left to it, as has been done in the case of the Madura farm. Sanction has been conveyed to the proposal of the Director of Revenue and Agriculture that the land asked for should be assigned rent-free, on the following conditions :—"that the garden be subject to inspection from time to time by the Collector and Agricultural Reporter to Government ; and that, in the event of the experiment being found to be a failure, or the object for which the grant was made being departed from, the land should be liable to immediate resumption without allowance for any improvements." It is not intended to allow any fixed term of years for the purpose of making the garden. The society having got the concession will, we hope, prove that the grant was not made in vain.

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It is satisfactory to note that the system introduced by the Madras Government five years ago of establishing Government fish-curing yards, with a view to secure a supply of properly cured fish for the market, has worked with beneficial results, not only to the consumers but to the Government itself. From the report for the half-year ending 31st March 1885, it appears that the operations during this period had made very material progress. Compared with the corresponding period of the previous year, the number of yards worked shows an increase of 14, *i.e.*, 123 against 109 ; and, in spite of the damage by flood in some of the southern divisions, there was an increase in the quantity of fish brought to be cured of 62 per cent, *viz.*, 14,844 tons against 9,141 tons. Taking the figures for the whole year, the quantity of fish brought to be cured rose from 11,789 tons in 1883-84, to 20,108 tons in 1884-85. As a matter of course, there was much opposition to the measure at first, but it was determined to replace the unwholesome stuff sold previously, as cured fish, by a better supply, and a system of issuing licenses was established. The fish-curers objected to pay for these licenses, but finding that there was no relaxation of the system, they have come round generally to accept the inevitable. In South Canara the fishermen have not yet become reconciled to the system, and have been slow to avail themselves of the opportunities which have proved so attractive in Malabar, probably in the expectation that the restrictions on the use of salt-earth might eventually be removed ; but now that they have been assured that relaxation of the law in their favour is not to be looked for, they may be expected soon to resort to the yards for the purpose of curing their fish. Financially, the operations of the half-year under review have resulted in a gain to Government of Rs. 6,081, which reduces the accumulated deficit of previous years by one-fifth. The experiments made by the department in improved methods of curing have, so far as they have gone, proved successful, and are to be continued.

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The *European Mail*, referring to the subject of agricultural education at home and abroad, says :—

Although the French Government voted 3,512,000f. for agricultural education this year, the *Echo Agricole* says it is not enough, and that the several departments need to complete the organisation. In England we are accustomed to think that agricultural instruction is very liberally provided for in France ; but our French contemporary complains that they have in France only one institute of agriculture, one national school of agriculture, and one of horticulture, 14 schools of practical agriculture, two shepherds' schools, one school of practical horticulture, two foraging schools, 23 farm schools, one cowhouse for breeding, two silkworm rearing schools, two primary agricultural schools, one agricultural and two horticultural courses of lectures in primary schools, 43 orphanages and agricultural colonies, 85 departmental professors of agriculture, three chairs of agriculture in Algeria, four chairs of agricultural chemistry and 31 agricultural stations; while Germany has 14 agricultural institutes, 451 primary agricultural schools, 71 schools of agriculture, seven veterinary schools, nine superior institutes of pomology and arboriculture, 64 agricultural schools of various kinds, 15 schools of practical horticulture, 11 dairy schools, five schools of agriculture for girls, one school of sugar refining, one school of distilling, 36 special courses of agricultural lectures, 65 agricultural stations, and 37 professors of agriculture. Italy, most persons will be surprised to learn, has three superior and 22 practical schools of agriculture, all created since 1880, six special schools, four of which are for viticulture and wine-making, and 19 agricultural orphanages and colonies dependent entirely upon the municipalities. Even little Denmark has an agricultural institute with 223 pupils, and 22 professors, 10 practical schools of agriculture, and 40 superior primary schools which give agricultural instruction.

How does India (an almost wholly agricultural country) compare with these statistics in respect to agricultural and horticultural education?

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The South of India papers are, we see, much exercised by the alleged discovery of payable *lignite* in French India at Bahour, within the limits of the settlement of Pondicherry, and they censure the inaction of the Madras Government for not tracing the same deposits into British territory, and adopting means for developing our own resources in this respect. The French proposal is still within the domain of speculation, and is not likely we suspect to get beyond that stage. The favorable views of the Madras press on the French scheme, appear to have been induced by the usual promising "prospectus" which has so often proved a delusion and a snare. Picked specimens and manufactured samples are not reliable data for practical conclusions as to remunerative returns. Figurative and ornate diction pleases the fancy, but does nothing towards refilling the pocket which it so often empties. The history of Indian gold-mining is perhaps, the most wonderful record of human infatuation of the century. It seems scarcely credible that in face of the millions sacrificed in this speculation, new fields for investment should be wanted to meet the public craving for excitement: and that such ventures should obtain public support, within so short a time of such expensive lessons as the Wynaad failures, is still more surprising. The latest project is this "Bahour lignite" undertaking, which is brought forward in the teeth of the opinion of the Geological Survey, that the deposits are little more than *carbonaceous mud*. Even should this mineral fuel prove as rich in carbon as is stated, the possibility of working the deposits in soil teeming with water under artesian conditions, would we understand be very unlikely.

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A London letter to the *Statesman* says:—The latter half of this century has been accentuated by exhibitions of which London has had nine—a classic number. Those held in the provinces have had, in their different directions, quite as important results. They have been special. Besides the vast improvements in livestock breeding, which those devoted to cattle have initiated, it would be difficult to fix the value of the impetus given to high-class farming by exhibits of agricultural implements and machinery. Shows of this nature have a double action—they not only cheapen and facilitate labour, they quicken the inventive faculty. Perhaps the *largest* display of this sort has this month been held in Essex, on the extensive grounds of the Shorthorn Dairy Co., Limited. A goodly number of London pressmen were present, and kindly entertained by Mr. Collinson of Hull, the Managing Director of the Company. The high class farmer, at such shows, appears in a special rig out. He does not regard life through a rose-coloured lens; he is naturally a pessimist. If drought weights the golden grain, it shrivels the root crops; so, come sun, come shower, weather never fits into his needs. Perhaps no one understands his moods better than his inseparable companion, his little dawg.* The London *Morning Post* and the *Daily Chronicle* gave elaborate articles on the different machines, and on the magnificent cattle with which the Company's farm of 2,200 acres is stocked. An enthusiastic farmer, fortunately independent of bad seasons and foreign competition, whom I met while flying north, descanted to me on the wonders of Barnard and Lake's new patent thatcher, which he had bought; on W. A. Wood's patent string binder, which his friend Col. Griffin had induced him to buy; and one of the steam ploughs he would certainly go in for before November, his choice lying between Fowler's steam plough and one of Messrs. Ransome's wide-furrow ploughs. Almost all the machines were shewn in active operation, and my *compagnon de voyage* described with pitying humour the action of a primeval flail wielded by a venerable labourer, side by side with the puffing and dextrous thrashing machine exhibited by Messrs. Ransome. This flail had been in Mr. Collinson Hall's family for eight centuries. "I hadn't," he said, "the remotest intention of buying even a spade when I entered the place: but I believe, though I've parted with a stiff sum, I was a richer man when I came out—so *vive les exhibitions!*"

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A few weeks back we noticed the unsatisfactory results of fibre experiments generally in Madras. We are, however, glad to find that samples of fibre prepared recently in the Government Farm at Saidapet from Manilla hemp plantain (*musa textilis*) and the common plantain tree (*musa paradisiaca*) and which were sent for valuation to Messrs. Collyer and Co., have been pronounced of better quality. Messrs. Collyer and Co. describe the fibre of *musa textilis* as of "good length, good colour, fairly clean, but mostly deficient in strength; fibre fine, but very brittle; value probably about £30 per ton." They add that this sample is superior to most of the samples sent from Southern India; but that it is much inferior to the Manilla hemp grown in the Philippine Islands. With regard to the fibre of the *musa paradisiaca*, it is said: "This sample is also superior to many we have seen, being good length, fair dullish colour, fairly clean, varying strength, mostly brittle and weak; if fully equal to sample, would probably realise about £25 per ton." It seems to us that the defect in the fibres produced in Madras is due rather to the mode of preparation than to the natural qualities of the fibres. It is unfair, therefore, to pass a verdict on the merits of the fibres, on badly prepared samples. Mr. Price drew attention to this very point very recently, and we quite agreed with him in thinking that unless we can send properly prepared samples for valuation in the London markets our experiments with various fibres in this country are mere waste of time, trouble, labour, material, and money. The following remark by Messrs. Collyer and Co. on the present samples is worth noting:—

The great abundance of superior fibres in this market renders the sale of any similar to above very difficult except at very low prices; they will probably be more valuable for local use, and we have also reason to believe that if spun upon the spot whilst the fibre is fresh before it gets thoroughly dried, a rope can be made much more durable and much stronger than the same fibre would produce if spun here.

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Mr. Pat Doyle, C. E., F. G. S., has addressed the following letter to a Madras contemporary regarding the coal supply of Southern India:—

"Allow me to remark, with reference to the concluding para. of the leader in your issue of the 17th instant, re 'The Coal Supply of South India,' that there is a great difference with a wide distinction between my *bona fide* commercial transaction and M. Deloncle's veritable speculation. It is hardly fair to class an attempt to introduce Bengal coal into Madras with a project—the Bahour scheme—as yet within the domain of imagination, and opposed to science and experience, or even to common sense. Bengal coal is extensively used for steam purposes—a proved and acknowledged success. The out-put is about 1,500,000 tons per annum, of which nearly 1,000,000 tons is consumed by locomotives on upwards of 4,000 miles of Railway in Bengal, the N.-W. P. and Oudh, the Central Provinces and Rajpootana. In the latter *locale* it is found economical to transport this coal fully 1,000 miles by rail, and use it at a cost falling little short of Rs. [illegible] per ton, as railway fuel. Madras is 800 and 8,000 miles distant respectively from the centres of coal production in Bengal and Great Britain. Madras, however, is entirely supplied by the latter. In the face of these facts and figures you will, I am certain, concede that the aspirations of finding a market in Madras for Bengal coal have not been raised on a basis of fiction, or deduced from data of a very imperfect kind. Any ventures made in this direction would be purely commercial—*bona fide* 'business'—in which the parties concerned would be risking their own money and not trading upon public credulity. Now to other matters. The stone as the Bahour lignite deposits is effectually disposed of by the fact that even should they prove worth working, the possibility of ever doing so remuneratively in soft ground teeming with artesian water is remote and improbable. It must not be forgotten that whatever the outcome may be re the Singareni field, the production there will, for many years after the opening of workings, go to meet the requirements of the Nizam's Railways. The Bellary-Kistna State line would be the first to absorb any surplusage from this source. From information received by last mail, I am in a position to state that 'a company is now negotiating with the Nizam's Government for the concession' of the mining rights in the Hyderabad dominions, which, I presume, will include the Singareni coal field. My own personal knowledge of the Southern extension of this area in the Godavery District is in favor of further prospecting by Government, with the view of testing satisfactorily, and disposing definitely of the question of payable coal in British territory in the Madras Presidency."

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We take the following from the *Globe*:—

From a Parliamentary return just issued, on the moral and material progress and condition of India during the year 1882-83, it appears that the tea plant grows will in Assam, in both the Brahmaputra and the Surma valleys, or rather in the hills dividing these two valleys; but its cultivation on the Chinese method was first experimentally attempted by the Indian Government in 1834. Chinese seed was at the same time introduced, and it has been found that the most profitable plant is a hybrid between the indigenous and the Chinese varieties. Assam is still the great home of the industry; but tea planting is also securely established at Darjeeling in Bengal, along the foot of the Himalayas as far west as Simla, at Chittagong on the further side of the Bay of Bengal, and on the Nilgiris and other hill ranges in the south. It has been started with fair prospects in Chota Nagpore and in British Burmah. Except in Kangra district in the North-West Provinces, tea-planting is entirely in the hands of Europeans. The coffee plant first attracted the attention of European planters in about 1840, but the industry did not make much progress until 20 years later. Since 1860 it has spread with great rapidity throughout the entire region of the Western Ghats south of Kanara, including the greater part of Coorg, Hassan, and Kadur districts in Mysore, the Nilgiris, the neighbouring portion of Malabar districts, and (more recently) the native States of Travancore and Cochin. It has also extended to the Shevaroy Hills in Salem district and to the Palni Hills in Madura district; but repeated efforts to acclimatise the coffee plant in other parts of India have not met with much success. Coffee remains a product of the extreme south even more exclusively than tea remains a product of Assam.. It differs from tea in being largely grown by native cultivators as well as by European planters. Unfortunately, coffee is a very delicate plant, being exposed not only to the vicissitudes of the season, but also to several insect pests of its own. Of late years the crop has not proved remunerative either in Southern India or in the adjoining island of Ceylon; in 1871-72 the total export of coffee from India reached their maximum, 507,296 cwts.; in 1877-78 they fell to 298,587 cwts., and by 1882 83 they had only recovered to 364,008 cwts. The corresponding values do not show such large variations, for East Indian plantation coffee is always in demand in the English market. Cotton is cultivated in every part of India for local consumption: but the great cotton-growing tracts, which furnish the bulk of the export, are Gujerat, Khandesh, and the Southern Mahratta country (all in Bombay) and, the neighbouring province of Berar. The cultivation was immensely stimulated at the time of the American war, when the ordinary sources of supply to the English market was closed. The exports rapidly rose till they attained the maximum of 7,000,000 cwts., valued at £35,000,000 in 1866 67. After that date they dropped as rapidly as they had risen, the minimum of 3,000,000 cwts., valued at less than £8,000,000, being reached in 1878 79. There has since been a marked increase year by year, and by 1882 83 the quantity had risen to [illegible],000 cwts., valued at £16,000,000.

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In our issue of June 6, 1885, page 269, we noticed the unsuccessful results of the experiment with silk-worms in Madras, the cause of which was attributed to the "impossibility of obtaining a sufficient supply of mulberry leaves, either on the farm (Saidapet) or from elsewhere," and that the worms "refused to feed on anything but mulberry leaves." The result was that a large number of worms, chiefly the big ones, which were ready to spin, had died. Although the mulberry tree is common enough throughout the length and breadth of India, yet here was an instance when it was found quite impossible to obtain mulberry leaves. This difficulty may occur at any time, but those engaged in sericulture will be glad to know that a method has been found, whereby they may guard against the recurrence of such a state of affairs. The method we refer to is nothing more than that of *ensiling mulberry leaves*. In the last number of the *Gardeners' Chronicle* to hand (September 5, 1885), we find the following quotation on this subject from the *Journal of the Society of Arts*:—

"During the silk-worm rearing season in Northern Italy, a large quantity of mulberry leaves are sent by rail from one place to another, and in many cases the railway administration run special night trains for this purpose. The leaves are packed loosely in sacks, and often arrive at their destination far from fresh, and consequently, if not totally unfit, at all events cannot afford a wholesome food for the nourishment of these insects. An experiment was made during the present season, by a silk-producer in Lombardy, in sending the leaves compressed; and for this, a bale was made, weighing 110 kilos, by placing the leaves between two round pieces of board (in this case the bottom of barrels), and compressing them in an ordinary wine-press; the bale was then firmly secured with iron wire. By some oversight this bale of compressed leaves, made on May 23, was not forwarded to Milan, and from thence to Niguarda, until the morning of the 31st, and consequently it did not arrive at its destination until later. On opening, the bale of leaves, with the exception of about two inches in thickness round the outside, were found to be perfectly fresh and sweet, and even these were only faded and found to be not unfit for food.

"This is a conclusive proof that the nutritive qualities of the leaves can be preserved for some time, if compressed, and the air thus excluded from them; care, however, must be taken not to crush them, and injure their tissues by excessive pressure. From this it would appear that a system of ensilage might be adopted with advantage for preserving mulberry leaves in the same way that it is for forage. Another advantage of such a plan would be that the leaves so compressed would be reduced in bulk, and consequently fewer trucks would be required to carry a given quantity of leaves than there is in the ordinary way; and by ensiling the leaves grown on the warmer side of the Appenines—as, for instance, on the "Rivieira" of Genoa, &c., it would be possible to supply the silk-worm rearers of Piedmont and Lombardy during back seasons, or when, from other causes, the leaves are scarce and expensive."

With this example before them, silkworm rearers in India need have no fear of running short of mulberry leaves. In any part of the country, where there may be a scarcity of leaves, it may be supplied from other parts where the tree is plentiful. Speaking from our own knowledge of the distribution of the mulberry tree in India, we should think the N.-W. Provinces, Oudh, and the Punjab would be able to meet all wants; for in these parts it abounds in more profuse luxuriance than in most others.

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The following is a summary of the health, crops, and weather reports for the week ending 23rd September 1885:—Rain is reported from all the districts of the Madras Presidency. In Bellary and Anantapore prospects have much improved. Elsewere they are said to be fair, though more rain is required in most districts. In Mysore slight rain fell during the week in the Tumkoor, Kolar, and Bangalore districts, but more is urgently required throughout the State, especially in the two districts first-named and in Chitaldroog. Agricultural operations have been resumed in some places, and the prospects of the season have slightly improved, except in parts of Tumkoor, Chitaldroog, Shimoga, and Kadur. The cattle continue in poor condition, but pasturage is reported to be more plentiful.

Good rain has fallen throughout the Deccan and Southern Mahratta country, and the condition of crops has been much improved. In most districts of Guzerat and in parts of Tanna and Colaba more rain is urgently needed. The *kharif* harvest generally promises well, [illegible] preparations for the *rabi* crops have commenced in places. In the Berars and in Hyderabad the rainfall of the week has been beneficial to the crops, which are generally doing well. In parts of Akola more rain is badly wanted. In Rajpootana more rain is wanted in several States, but crop prospects are, on the whole, favourable. Rain is also wanted throughout the Central India States.

From the Central Provinces good rain is reported in the districts in which it was most wanted, and prospects have much improved. More rain is, however, very generally required. In the Punjab slight rain fell during the week. *Kharif* prospects are generally good, and agricultural operations for the spring crops have commenced in places. In the North-Western Provinces and Oudh the rainfall has been slight, and more rain is wanted, both for rice crops and *rabi sowings*. General prospects are however good.

In Bengal rain has been general, though fortunately less heavy than in previous weeks, and the cessation has been very beneficial. The *Bhadoi* harvest is in progress, and late rice crops on lands not inundated are doing excellently. Floods have caused more or less damage in many places, particularly in parts of the Burdwan and Presidency divisions. In Assam much rain has fallen during the past fortnight. In Sylhet crops have been much injured by floods, which are, however, reported to be subsiding. In the other districts, agricultural prospects continue generally good.

In British Burmah the weather continues seasonable.

The public health is generally fair in most provinces.

Prices are fluctuating in the North-Western Provinces and Oudh, and in the Central Provinces. In the Shimoga district of Mysore they are reported to be rapidly rising, and a slight rise has also occurred in Coorg. In Bengal the price of rice continues high. Elsewhere prices are fairly steady.

GENERAL WILKINSON ON ENSILAGE.

We have read with interest the report submitted by Brigadier-General H. C. Wilkinson, on the Ensilage experiments carried out by him during 1884. The report is dated 28th May 1885, although it was only a few days ago that we were favoured with a copy by the courtesy of the Director of Agriculture, Bengal—a period of four months having elapsed since the date of writing.

The General has dealt with the subject exhaustively in his report, which is the most complete and satisfactory one we have seen in India since the time this method of storing green fodder first attracted attention in this country. The four opening paragraphs are devoted to an explanation of the 'leading features of the system.' We agree in the conclusions drawn by the writer, except in regard to the statement that "any enclosed space can be used as a silo"—to wit, "a hole or trench in dry ground." It is obvious that a hole or trench dug 10 feet deep in Bengal is sure to be wet and moist, which circumstance in itself is opposed to *the* most essential condition of a silo, *i.e.*, that it must be water-tight. Again, we do not quite agree in the remark that "'sweet' ensilage will not keep." The fifth paragraph is the most important, in our opinion, as at once stamping the method with the 'hall-mark.' It runs as follows :—

> "*Silage has been found by experiment to be more fattening and nourishing than green grass; and cows fed upon ensilage give more milk, and their milk yields more cream than when they are fed upon grass.*"

We have italicized this paragraph in reference to its importance. Mr. D. B. Allen must have had this report before him, when he wrote us the letter, dated 10th August 1885, and which appeared in our issue of the 22nd idem; for he quoted from General Wilkinson's report, which at that time we had not seen. He said—"Indeed the General himself seems to disbelieve in the accuracy of this experiment;" and he quoted the following passage in support of this statement :—"With this universal (but variable) daily decrease of yield, it has been found impossible to tabulate the advantage gained by the use of silage for increasing the yield of milk." But Mr. Allen omitted to finish the sentence, which continues thus—with a comma after 'milk,' "but during the progress of these experiments, it has been evident that the use of silage *did distinctly retard the gradual decrease in yield*, and in many instances increased it for a time." [The italics are ours] This ending alters the meaning of the sentence somewhat, we think. However, to proceed with the General's report, we notice that he mentions *three* ways of loading a silo, *viz.*, the quick, the slow, and the 'sweet silage' system. He is decidedly in favour of the first named method. But the disadvantages are stated to be that—

> "However firmly pressed down and trodden the green forage is, it still, at first, occupies from ¼ to ⅓ more space than it does a week later, when fermentation has died out, so that from [illegible] of the silo space available eventually remains unoccupied."

This is, of course, a very material point; and we should think that, as this loss of space can be avoided without detriment to the silage, we incline to the slow as the better method of the two. There are, however, two opinions about the merits of the slow process. The General says :—

> By this system, as the grass is not covered over till the silo is filled, but is only trampled down as firmly as possible daily, fermentation sets in at once, and progresses slowly until the work is completed.
>
> The advantages claimed for this system are that it is much more convenient, especially for small farmers; that the action of fermentation, causes the grass to settle and pack much more closely than it otherwise would, thus enabling the silo to be filled slowly to the very top, after which little settlement takes place.
>
> That the grass, though much more fermented, is still in a state that many believe to be the very best for feeding and fattening purposes.
>
> On the other hand, some think that during this process of fermentation the forage loses an appreciable amount of its actual bulk and weight.

With regard to sweet silage, the General makes the following remarks :

> A little partly made sweet hay is put in the bottom of the silo (to act as yeast does in bread making); green forage is then lightly loaded in on the top of the partly made hay to the depth of about a yard; this is *not* pressed down or trampled, so that strong fermentation sets in at once. As soon as a temperature of 122° Fahrenheit is reached, the forage is firmly trampled down, the "bacteria" of sour fermentation having been destroyed by this heat. More green forage is now added to the depth of another yard, and the process is continued as before till the silo is quite full, when it is covered over like any other silo.
>
> If every portion of the contents has been duly heated to a temperature of 122°, the result will be silage as sweet as good old hay.
>
> The advantages of this system are that the very strong and disagreeable smell of sour silage is avoided, and that the silo (as in the slow loading system) can be filled to the very top.
>
> The disadvantages are that it takes much more time and trouble; that the green grass must not be very wet with rain; and that when the silo is once opened, the contents must be rapidly consumed, as "sweet silage *will not keep*."

We do not, however, remember to have read or heard that "sweet silage will not keep"; but not having seen any sweet silage made in this country, we are necessarily unable to verify the statement. But it may be taken for granted that General Wilkinson had practical experience in the matter, and his assertion may be accepted as correct.

The silos used by him were all built of *pucca* masonry, so that the essential condition of air and water-tightness was fully met. He lays it down as a fundamental rule that "perpendicular sides are essentially necessary to a good silo." This point is insisted upon by all who have experimented with ensilage. Another material point, the General might have added, is the *smooth surface* of the said walls. The temperature of the slow-filled silo never exceeded 89° Fahrenheit. The quantity of grass put into it was 15,300lbs., or 191 maunds. The pressure of earth at the top was equal to 200lbs. to the square foot. Two other silos were also filled, and were nearly similar to the first one. The fourth silo was filled on the slow-loading system, and six days were occupied in the operation. The temperature did not exceed 110° Fahr. in the heart of the silo. The quantity of grass was nearly the same. In noticing the silo in which sweet silage was made, it will be as well to quote the General *in extenso*. Filling in was commenced on 2nd January 1885 :—

> *January 3rd.*—The temperature had risen to about 112° Fahrenheit, but in no place could it be found higher than 115°.
>
> So about two feet more green grass was shaken in on the top to try to increase the heat, as it will be remembered a heat of not less than 122° Fahrenheit is necessary in this operation to kill the bacteria of sour fermentation

January 4th.—In the morning the heat at the very bottom of the tube, or just above the one foot layer of hay, was found, to be fully 120°, and by evening it was up to 130°. Being Sunday nothing could be done. The upper part was not above 110°.

January 5th.—Duty kept me absent till 5 P.M., but on the morning of this day fresh green grass (freed from excess of moisture as before) was lightly shaken into this silo to the depth of three feet more. At 5 P. M. the temperature was as follows :—

At 1 foot from the bottom	147° Fahr.
,, 2 feet ,, ,, ...	147° ,,
,, 3 ,, ,, ,, ...	123° ,,

Immediate steps were therefore taken to stop further fermentation, by trampling the grass as well as could be done by two men; no permanent weight was placed on it.

January 6th.—At 7 P.M. the temperature of the silo was as follows :—

At 1 foot from the bottom	142° Fahr.
,, 2 feet ,, ,, ...	133° ,,

January 7th.—Four maunds were added ; temperature 133°.

January 8th.—Eight more maunds were added ; temperature—

At 1 foot from the bottom	133° Fahr.
,, 2 feet ,, ,, ...	129° ,,
,, 4 ,, ,, ,, ...	116° ,,

January 9th.—

At 1 foot from the bottom	125° ,,
,, 2 feet ,, ,, ...	123° ,,
,, 3 ,, ,, ,, ...	131° ,,
,, 4 ,, ,, ,, ...	130° ,,

January 11th.—More grass added.

,, *16th.*—Temperature—

At 1 foot from the bottom	92° ,,
,, 2 feet ,, ,, ...	105° ,,
,, 3 ,, ,, ,, ...	127° ,,

The silo was covered up on this day, having taken a fortnight to load.

January 18th.—Temperature—

At 1 foot from bottom	92° Fahr.
,, 2 feet ,, ...	105° ,,
,, 3 ,, ,, ...	101° ,,

January 27th.—Temperature—

At 1 foot from bottom	92° ,,
,, 2 feet ,, ...	93° ,,
,, 3 ,, ,, ...	95° ,,

It will thus be seen that the highest temperature (147° Fahrenheit) had been reached on the third day after filling, and then there was a gradual falling, until the bottom temperature had come down to 92° Fahrenheit. This is in accordance with Mr. Fry's practice. The result of this operation was sweet silage.

In addition to the foregoing, General Wilkinson also experimented with pit and stack silos—the former with the object of demonstrating a simple method that could be "strictly imitated by any able-bodied peasant and his son." It merely consisted of a hole in the ground 5½′ × 5½′, with perfectly perpendicular sides, plastered with moist clay. Forty-two maunds of grass were filled in, and common country mats of the value of two annas were placed on the top; and the earth that had been dug out was piled on the top of the mats, until the grass had subsided sufficiently. The cost of this simple silo was only the labour of two men for two days, and two annas for mats, in addition to the cost of cutting and collecting 42 maunds of grass. What the quality of the silage thus made was, is not stated. This is to be regretted.

The stack silo was little more than four feet high when finished. It was built on a 9-inch plinth of earth, well rammed, to raise it above the damp soil. It was 5 feet in diameter at the base. The top was covered with mats, with a thin layer of clay, and heavy iron bars were used to weight it, which gave a pressure of 200lbs. to the square foot. On opening, it was found that the air had penetrated to a distance of a foot all round the stack, which, being only 5 feet in diameter, represents a large proportion of the whole; but the centre was found to be in really good condition, and was used to feed the animals belonging to the Transport Department. Of course, it is natural to infer that the larger the stack and greater the weight, the less will be the proportionate loss by rot and mould. To explain the plan more fully, the General has quoted the process invented by Mr. C. Johnson, of Oakwood, near Darlington, which we shall notice hereafter.

The grasses used in these experiments were *Imperata arundinacea*, or "Ooloo" of Bengal, and *Andropogon pertusus*, known in Banda as "nalwal," "palnah," and "kukar," and "palwan" and "minigar" in the Punjab. It is described as an excellent grass, not known in Bengal until discovered growing in the ditch of Fort William.

The results of these experiments, the feeding experiments, and our own comments, we reserve for next week.

WHITE SILK-COTTON TREE.

THE *Mysore Gazette* of September 12, 1885, contains some very interesting correspondence regarding this economic tree, its numerous varieties, distribution, and other information, which should be read with interest. The correspondence, it would appear, originated in a letter from Mr. Cameron, Superintendent of the Lal Bagh at Bangalore, in which he drew attention to the qualities of the silk-cotton yielded by this tree, and recommending its more extended cultivation, and conservation where it already existed. The Mysore Government, acting on this letter, circulated copies to the several Deputy Commissioners, Sub-Divisional and Forest officers, with a request that, after careful enquiry, a report may be forwarded showing in what taluks the trees are now to be found, and where their growth is most luxurious. Also, what encouragement would be necessary to extend its cultivation. Replies were received to this circular, which go to show that the tree is more or less indigenous in Southern India—at any rate, certain species of it are.

Before going further, it may be well to state that there is some doubt as to whether the tree named by the Mysore Government is the one to which particular attention is drawn, and which is believed to be indigenous to Southern India. The *Eriodendron anfractuosum* is the variety referred to. This tree belongs to the natural order of plants which come under the general head of *Sterculiaceæ*, to which belong also other *tribes* of the same *genus*, such as *Bombaceæ*, *Helictereæ* and *Sterculieæ*, all possessing to a more or less degree a silky covering around their seeds. One of this tribe, *viz.*, the *Helictereæ*, is grown for the fibre which it yields. The Silk-Cotton tree of Northern India has long been known to be the *Bombax heptaphyllum*, (or *pendandrum*, in reference to the division of the leaf, which sometimes has five, at others seven segments), and is known to the natives of Upper India by the name of *Semul*. It is not cultivated, but is found growing in a wild state. The fluffy silk-like cotton is gathered as soon as the pods assume a ripe appearance ; for if not gathered then, the pods fly open later on, and the cotton, with the seeds attached to it, is blown to the winds. The silk of this tree, however, is pronounced to be of an inferior kind, inasmuch as it cannot be twisted into thread. There are other species that yield silk-cotton, *viz.*, *Chorisia speciosa*, *Eriodendron Samanna*, *Bombax Ceiba*, and *Ochroma lagopus*. These are all large-growing trees. To these must be added the *Calotropis gigantea*, or common *madar* of the jungles—a wayside weed, to be found everywhere in India.

The *Eriodendron anfractuosum*, which forms the subject of the correspondence, grows all over Southern India, but the natives attach no value to the silk-cotton it yields. It is by no means plentiful in any one locality ; but being indigenous, is cultivated by the ryots in betel-nut gardens, owing to its fast growth, to serve as a support for the betel-nut vine, which entwines itself around the tree in its growth. According to the Assistant Conservator of Forests, Shimoga, it is very easily propagated by means of "stakes" planted 4 to 6 feet apart as these are said to "take" sooner than seed. The tree attains a good size, averaging from 4 to 8 feet in girth, and from 10 to 30 feet in height.

Mr. Graham Anderson, of the South Mysore Planters' Association, has contributed a valuable memorandum on the Silk-Cotton trees of Mysore, which we quote below in its entirety ; as Mr. Anderson says that the trees indigenous to Mysore have engaged a large share of his attention for many years, and therefore the following remarks by him are most valuable :—

The Superintendent of Government Gardens in Bangalore deserves the thanks of the agricultural community for the attention which he has drawn to the subject of silk cotton, and it is earnestly to be hoped that in the future he will further assist by making public any information of a similar nature regarding other products which may appear to him worthy of introduction or cultivation, it being impossible to over-estimate the benefits which the department over which he presides is capable of bestowing on the Province generally. As I have personally no pretensions to technical knowledge, I am not at all sure that I have correctly identified the kapok tree, but I most diffidently venture to make a few remarks on the silk-cotton-producing trees of Mysore, and to refer specially to one which in my humble opinion most closely answers to the description so obligingly afforded.

Among the varieties of the order *Sterculiaceæ* to be found in our Malnad, I failed entirely to recognize the *Eriodendron anfractuosum*, and have consequently made some careful inquiries about it.

My remarks, I trust, may be of some service even if they only lead to prove that more yet remains to be learnt regarding the tree, both as to its identity and the possibility of extending its cultivation.

Bentley divides the order *Sterculiaceæ* into three tribes :—

Bombaceæ.—Examples ; *Adansonia, Eriodendron, Bombax, Cheirostemon, Durio, Ochroma, &c.*

Helicteræ.—Examples ; *Matisia, Helecteres, &c.*

Sterculieæ.—Examples ; *Sterculia, Heritiera, &c.*

Lindley enumerates 37 genera and 128 species as belonging to this order. (Bentley).

The plants of interest are referred to as follows :—

Chorisia speciosa.—Has its seeds covered with silky hairs which are used for stuffing cushions, &c. It is termed vegetable silk.

Eriodendron Samauma.—South America ; remarkable for its great height. The hairy covering of the seeds of various species of *Eriodendron* is employed for stuffing cushions, &c.

Bombax Ceiba.—The silk cotton tree of South America.

Bombax Pentandrum.—The silk cotton tree of India. The seeds of these are covered with long silky hairs. These hairs cannot be used like those of ordin[illegible]y cotton for manufacturing purposes, chiefly on account of [illegible]e smoothness and want of adhesion between their sides. (Bentl[illegible].)

(3672) The wool of seve[illegible] species of *Eriodendron* and *Chorisia* is used for stuffing beds and cushions, and that of *Ochroma lagopus* substituted for beaver. (Page 819. Outlines printed by I. and C. Adlard).

In the Malnad the varieties of *Bombax* are as follows :—

Mulburaga (Canarese) (*Bombax heptaphyllum* or *pentandrum* (?)) large, very thorny deciduous tree with a red flower. Yields very inferior silk-cotton which cannot be twisted into a thread, the fibre being very brittle ; grows in the Malnad Forests.

Buraga, Billiburaga. Canarese.

A somewhat smaller, deciduous tree with a white flower. Hardly any thorns at all. Yields a somewhat better cotton which can only be used for stuffing purposes. Grows on the edge of the open country to the east, but is very rarely found in the Malnad. The bark is said to be used by the natives for intestinal disorders of cattle.

The cotton escapes from the pod about February-March, and is very difficult to collect owing to the strong east wind which then prevails. The thorns of the *Mulbuaga* offer an insuperable difficulty to gathering of produce.

As the wool of the *Eriodendron* (*Erion*—wool, *Dendron*—tree, Greek) is explained to have been spun into yarn and made into articles which have been submitted to the Colonial Museum at Haarlem, and is further described as being used for tinder, I immediately concluded that our Billiburaga was not the tree referred to, and consequently directed my inquiries to the eastward with the result that I found a tree known as the *Dudi Mara* (Canarese, the *Tinder* tree) (Yelliam panji, Tamil), in Hassan. This tree is propagated both from seed and trunk cuttings, and is used in the supari gardens for growing the *betel-leaf creeper* upon.

The silky wool of this tree is certainly very superior to the produce of any of the buragas, [illegible] has, I regret to say, quite escaped my observation.

The sample herewith sent, together with one of the pods, will suffice for identification.

Should this tree be the kapok, the knowledge that the produce is a marketable commodity will go far to at once induce owners to carefully collect it.

I should imagine that all well-drained good soils would be suitable for the growth of the dudi tree, and all jungle lands would answer admirably.

The tree is however not one that would stand wind, and being deciduous, would not do for shade for coffee. I am doubtful as to whether the crop would be one which would be remuneratively gathered in the wet climate of the Malnad, as it appears to mature in June, or just at the beginning of the South-West monsoon.

The experiment is, however, well worthy of trial on a small scale on abandoned clearings and jungle scrub land.

In a strictly agricultural province like Mysore, an immense amount of good can be done by the introduction of new products, and I most sincerely hope that the skilled services of the Superintendent of the Government Gardens may be utilized in that direction, precisely in the same manner as in the Crown Colony of Ceylon and elsewhere.

The matter of exchange and introduction of seeds with foreign countries is an impossibility with private individuals, and the single fact that the dudimara has hitherto been almost wholly neglected, is a good example of the immense benefits which the talented Superintendent of the Government Gardens could confer on the agriculturist, if the requisite facilities and funds were placed at his disposal.

The silk-cotton gathered from these trees is known by the name of kapok. It is ready for harvesting in the beginning of summer, or in the months of February and March. When separated from the pod, and cleaned, the total amount of kapok received by the Mysore Government from the districts did not exceed 30 lbs., from which quantity an assortment of 22 lbs. was well cleaned, and equally divided for valuation in London and Rotterdam. In Holland the kapok has a somewhat extended trade; but it appears that the article imported from Java is of a somewhat superior kind. This is, however, not the product of the *Eriodendron* or any of the silk-cotton trees, but of the *Calotropis Gigantea*, or Madar. Messrs. Collyer and Co., Brokers, of London, to whom a sample of *Eriodendron* kapok was sent, made the following reply dated 6th February 1885 :—

We have received one case of *Sennil Cotton* per S. S. *Khedive* through Messrs. Arbuthnot and Co., Madras.

There is but little demand for this material for home consumption, but large trade is done in it between Holland and the Dutch East Indies, the quality of the latter being preferred owing to its greater length and lightness. Your sample is rather short, fairly but not quite well cleaned, nominal value about 50s. per cwt, and would sell for export in considerable quantities.

For home use a somewhat similar material is wanted, small sample enclosed ; we should be glad to receive samples of what you can offer, and lowest price you can supply specified quantities at freight paid to London, the extent of the demand will depend upon the quantity obtainable at low prices, say 5d. to 6d. per lb. nett weight. Please state clearly what quantity you can sell and in what months it could be sent forward, and total quantity available if collection is worth attention.

They followed up this letter by another, dated 13th February, saying :

We confirm our report of 6th instant. It is uncertain how far a material reduction in price will stimulate consumption, the stock in Holland is large, say 2 to 3,000 cwts or more, the average price for good clean quality is there 70 to 90 per cwt., the value put upon your sample in Amsterdam was 47 to 55 per cwt. Our manufacturers of down-quilts, &c., will not admit kapok into their factories, preferring to maintain their high standard of quality by using actual feather down. Probably new uses may be found if the material becomes plentiful and cheap. As indicated in our last, a demand is arising for long stapled varieties. We sent one sample last week; we enclose another even more wanted which appears to be "Sennil ;" this would sell freely at 5d. to 6d. per lb. for a special purpose.

Any further samples you can send us shall have our best attention not only of "Sennil," but of any new variety of fibre or other products.

The reply from the Rotterdam tradesman (J. C. Kintgen), dated 24th February, was as follows :—

I feel much obliged for the pains you took in addressing me the case containing kapok from your forests, and which you announced me by your favor of 20th January 1885.

I received that case in most perfect order, and I am pleased to declare that this quality of kapok is not inferior to that from Java, Perhaps it might interest you to hear that kapok cleaned in this manner, now is paid 5d. per ½ kilo or 4½d. per English lb. (English currency sterling) free in the harbour of Rotterdam.

The foregoing reports are, of course, favourable as regards the quality and condition of the samples submitted for valuation; but the prices offered are considered so low, that the Mysore Government do not think it expedient to take any further steps to advance this industry. The sample sent by Collyer and Co. was found to be the seed cotton of the *Calotropis gigantea* which, as we have said before, is about the commonest weed to be found on the plains of India.

INDIAN STATISTICS.

There is probably no country in the world in which statistical researches are so crudely pursued as in India. Too often the figures fall into the hands of men who have some pet theory or conclusion to establish, with the result of making them prove almost anything that is desired. It is impossible to give five minutes' attention to the resolution in the *Calcutta Gazette* of the 23rd September, on the Medical institutions of this city, without seeing at once how this habit has warped all its conclusions. Thus we find the mortality from small-pox in the city in the last ten years, to have been as follows :—

	Per Mille.		Per Mille.
1875 ...	... 720	1880 ...	... 114
1876 ...	... 71	1881 ...	... 128
1877 ...	... 67	1882 ...	... 17
1878 ...	...1,495	1883 ...	... 73
1879 ...	... 772	1884 ...	... 478
Average ...	... 625	Average ...	... 162

Now one would reasonably suppose that it lies upon the very surface of these figures—which we have simply re-adjusted to shew their teaching—that the mortality from this disease in any given year, arises from its assuming now and again, an epidemic form. If the figures prove anything, they prove we say that the high mortality that takes place in some years, as in 1875, 1878-9, and 1884, is the ordinary and unavoidable result of the disease assuming an epidemic form. The very low mortality in other years, indeed its almost total disappearance, shows on the other hand that the normal condition of the city must be held to be satisfactory. This conclusion lies we say, on the very face of the figures, but as it is the settled purpose of the Executive Government to throw blame and discredit upon the Municipality, the fact that the disease assumed an epidemic form last year, leaves "no doubt"—observe the phraseology—in the mind of the Inspector-General that these 478 deaths in 1884 show "the need of far greater activity on the part of those whose duty it is to protect the people." That the average mortality during the last five years was but 162 deaths per year against an average of 625 in the previous five years, would lead any candid mind to the inference that great, and unusual, and successful efforts have been made to protect the people : but as *that* is a conclusion that the Government does not want to admit, the figures are boldly used to suggest an entirely opposite belief. The most crucial test we can apply to the health of any city in India, is the mortality from *fever* therein. Let the reader then observe the following figures as adjusted by ourselves :—

	Per Mille.		Per Mille.
1875 ...	... 5,328	1880 ...	3,797
1876 ...	... 4,361	1881 ...	3,765
1877 ...	... 5,151	1882 ...	3,618
1878 ...	... 6,086	1883 ...	3,442
1879 ...	... 4,796	1884 ...	3,618
Average of 5 years ...	5,145	Average ...	3,648

Here again, if the figures prove anything, they prove that a singularly gratifying success has attended the labours of the Municipality to improve the sanitary condition of the town. As a fact, it is these statistics concerning *fever*, that constitute the very heart of the enquiry, and because they establish in the most absolute manner, the vital improvement that has taken place in the conservancy of the city,—the Secretary, for we do not like to lay the blame upon the Lieutenant-Governor personally,—the Secretary to Government passes them over in dead silence. The Lieutenant-Governor must see that they show the hollowness of the outcry got up against the Commissioners, while the public can now see the *insincerity*, as well as the hollowness, of the cry.

Every one knows that cholera and small-pox are capricious in their appearance, and that cholera in particular is so mysterious in its affinities, that it is impossible to affirm with any certainty the specific causes of its outbreak. The disease that is largely under control is fever, and because its statistics disprove and dispose of the attacks made on the Municipality, the Lieutenant-Governor is silent about them altogether. This is not the way for a ruler to earn the respect, or confidence of the ruled. We invite the attention of Lord Dufferin to this brief note, and we suggest that he should ask Mr. Mackenzie to reconcile it with the despatch that he made the Viceroy sign, a month ago, on the merits of the Commissioners.

THE FLOODS.

Governmental Measures.

The rains have been very heavy in the last few days, coming in cyclonic bursts that fortunately do not last very long, but that are very violent for the time. From a letter issued recently from the Revenue Department, to the Commissioner of the Presidency division, we learn as to Jessore, that—

> A large tract of the country, estimated at about 360 square miles in the Bongong sub-division of Jessore, has been inundated by the river Ichamati and its tributaries overflowing their banks. A large proportion of the *aus* crop appears to have been saved, but there is reason to believe that the *amun* rice has been almost entirely destroyed. Only one life appears to have been lost, but the people are undergoing much discomfort and hardship. No actual distress is reported ; rice is selling cheap in the flooded tracts, and some shop-keepers who went out with food from Jessore found difficulty in disposing of their stocks.

Until the flood-water has drained off, the Government finds that it can do nothing beyond dealing with emergent cases of individual distress. For this purpose, the Collector is authorised to expend Rs. 500 on petty relief, and the Lieutenant-Governor has sanctioned the expenditure of a further sum of Rs. 1,[illegible]00 pending the introduction of systematic relief measures, should that be necessary. In the distribution of this amount, the assistance of private persons, missionaries, and others who are specially acquainted with the wants of the people, is to be enlisted.

> In the event of relief measures being deemed necessary, definite proposals should be submitted for works to be undertaken from Road Cess or Provincial funds, for small advances under the Agricultural Loans Act, and for loans of larger sums under the Land Improvement Loans Act. Grants under these three heads will, the Lieutenant-Governor believes, probably be found sufficient to meet the needs of the bulk of the distressed population ; while in cases of individual distress, the Government may hope that some assistance will be derived from private charity.

As to Nuddea, the flooded area comprises two tracts of country, which have been affected by the inundation caused by the bursting of an embankment on the *Bhagiruthee*, aided by the excessive rainfall. The northern tract of flood comprises Khoostea and Chooadanga and part of Meherpore, but no very serious damage appears to have been done. In the southern tract unfortunately, "the aspect of things is more gloomy. Only a small proportion of the *aus* crop appears to have been harvested, and it is feared that much of that has been destroyed by the floods overtopping the village threshing floors, and of the *amun* crop no portion is likely to be saved."

> It follows from these facts, that in the northern tract the class of landless day-labourers will suffer to some extent from want of the work with which the rice harvest ordinarily supplies them ; while in the southern tract pressure will be felt by both the cultivating and the labouring classes. To the labouring class in both tracts, relief can most suitably be given by opening works at carefully selected centres, and I am to accord formal sanction to the expenditure of Rs. 5,000 in the district of Nuddea on this account. Sir Rivers Thompson hopes, however, that the magnificent harvests which are expected everywhere outside the flooded area, will draw off the surplus labouring population of this part of the country. This is the more desirable as the collection of labourers upon works in a country recently flooded, is not unlikely to result in a serious outbreak of disease. For the cultivating classes, it seems likely that no relief measures will be necessary, and that they will be enabled to tide over the period which must intervene before the rubbee crop can be reaped by a judicious distribution of advances under the Agricultural Loans Act. For this purpose the Lieutenant-Governor sanctions the expenditure of Rs. 10,000 in Nuddea. Specia

measures should be taken to facilitate the distribution of advances by the sub-divisional officers, and to make it generally known that Government is prepared to offer this assistance towards the cultivation of the *rubbee* crop.

These measures seem at present to the Lieutenant-Governor, to meet the necessities of the general mass of the population, although individual cases will probably occur, in which *gratuitous* relief will be needed, and for this relief the Collector of Nuddea is seeking the assistance of zemindars and others.

The Lieutenant-Governor has no doubt that private liberality will do much in this direction, particularly in the way of assisting people to rebuild the large number of houses destroyed by the floods. In the meantime, and until private charity has been fully organised, I am to convey sanction to the expenditure of Rs. 100 on relieving persons who are incapable of work. I am to add that the distribution of this sum may properly be entrusted to private individuals, missionaries, and others who are minutely acquainted with the wants of the people in the flooded tracts.

Regular reports of the condition of the people are to be carefully submitted, and the Lieutenant-Governor himself left Calcutta a few days ago to visit the districts.

Miscellaneous Items.

The coffee crop of the current season in Ceylon is expected to be a late one, owing to the spring-rains having been deferred. It is likely to be the same on the Nilgiris, both from the cause stated above, and from the crops of 1884-85, having been on the trees as late as April and May, and from the planters not being in a position to strip at the usual time.

A DEPOSIT of sulphur was lately accidentally discovered in the Narsapur taluk in Godavari. In digging on a piece of waste land, some earth was turned up, the peculiar appearance of which attracted the attention of one of the passers-by, the village magistrate, who, having secured a small quantity of it, forwarded it to the Civil Surgeon. A rough analysis of the earth disclosed that it was strongly impregnated with sulphur, and a further examination of the locality in which it was found resulted in the discovery that the deposit extended over a considerable area.

A TELEGRAM to a Madras paper says that the want of rain is generally felt by the ryots of the Mysore district. Hardly any fields beyond Colu[illegible]patam on the Mysore Railway line have been sown, and prices of rice and ragi are ranging high. The Mysore country beyond Mysore looks barren. Great anxiety is felt in regard to the season prospects.—Mr. Girdlestone, British Resident, proceeds to Mysore on the 1st proximo for the Dusserah festivities, and the Maharajah and the Dewan will then consult him as to the organisation of the necessary relief measures. The weather here is pleasant.

THE *Bombay Gazette* says :—As there has been a good deal of conjecture here as well as in England, about the ultimate success of the Indian Village, we have obtained a list of the people engaged to go to England, with their particular work and the rate of pay. We see in the list a snake-charmer, a dancing-girl, and our old friend the inlaid-box worker. The rate of salary is very fair, almost verging on liberality. Mr. Bonner, the agent who had come out to India to organise the movement, acknowledges the services of Mr. De Vitre for the assistance rendered in procuring the different workmen. Mr. Bonner states that Mr. De Vitre's tact in overcoming the obstacle of caste prejudices was remarkable. It should be added that Francis Rebello and Jeronimo Rebello and three Mahomedan weavers left Bombay for England to represent some of the industries of Tannah at the Indian Village Bazaar. The Rebellos will exhibit the well known hand-made silk, and the weavers the equally well-known Tanna cloth.

Selections.

CINCHONA HARVESTING.

A SUBJECT which has been much discussed amongst planters, without its ever arriving at a satisfactory conclusion, is that of the best method of working cinchona trees. Hitherto the area under yielding trees has been comparatively small, and isolated planters have been content to try one system or another with varying results. But millions of plants have been put out within the last four or five years in this presidency, and will soon be fit to bark, so it is of great importance that the matter should be enquired into, and an authoritative decision, if possible, be made on question. We may say, at the outset, that we are not in a position to give such a decision. All that we propose to do is to indicate the lines on which such an enquiry should proceed.

There are three systems of taking the bark more or less in vogue, namely, stripping, shaving, and coppicing. The first of these has, we believe, not been generally found to answer. It consists in removing a long strip of bark down to the wood, and then covering up the part to allow it to renew ; but the bark very often refuses to renew under this treatment, and the tree is permanently damaged, if not entirely destroyed. Shaving is the process most usually adopted, and it has one advantage, at least, over coppicing, *viz.*, that the proprietor gets a small revenue each year after the fourth, instead of having to wait till the seventh or eighth, and possibly, losing his tree by canker in the interval. It may be done with the ordinary pruning-knife, which many planters maintain is the best instrument for the purpose, or with specially-made spoke shaves, or with a Ceylon invention called a box-scraper. This last answers very well for original bark, but, as at present made, will not remove the thick or renewed bark ; it is also rather expensive. After shaving, the tree is usually covered with grass. The rival methods of shaving and coppicing have both advocates who insist on the superiority of their own plan, and it is difficult to decide between them. A few years ago, when "druggists' quill" was worth four shillings a pound, a man who could cut down a few thousand well-grown trees made a small fortune. Unluckily there were very few who could do so. The demand for this variety—apparently only to be used as an ornament in druggists' shop windows—seems now almost to have died out ; for while the enormous Ceylon export has lowered the price of every kind of bark, the fall in quill is greatest of all. Shavings, which were worth half a crown or three shillings a pound, are now down to eighteen pence, but the quotations for quill have sunk even lower. While, too, it is evident that the Ceylon supply of bark is gradually becoming exhausted, and that the market for ordinary kinds is improving, it seems questionable if quill will be again in great demand. Still, if we take the present market rates as a guide, the pecuniary advantages of the two processes appear to be pretty evenly balanced. The question as to whether the tree is checked in its growth or not by continued shaving may be left out of the present calculation ; it seems agreed that, if the operation is carefully performed at the proper season, not much harm is done.

The following are approximately the respective revenues that would be derived from shaving or coppicing a fair specimen of cinchona succirubra by the seventh year, three annual shavings being about what an average tree will stand, though it is sometimes carried on longer. *Shaving* four years (original) 6*d.* ; five years (renewed) 10*d.* ; six years (renewed) 10*d.* ; seven years, cutting down 4*s.* ; total 6*s.* 2*d.* *Coppicing* at seven years, quill say 3 lbs., 4*s.* sundry (branch etc.) 3 lbs. (at 9*d*) 2*s.* 3*d.* ; total 6*s.* 3*d.* The above estimates are, it will be understood, only such as can be made from data accessible to the ordinary cultivator, and are therefore open to correction ; planters, as a rule, have had to work very much in the dark in this matter. Only one establishment in India—or indeed in the world—could, if it wished, give us full statistics on the subject. But useful as such statistics would be to the whole body of cinchona growers, the authorities at the Neddiwuttum Government Gardens prefer to keep them from the light of day. They go on flooding the market with bark, caring, and from all accounts knowing little whether the sales show a profit or a loss, but they steadily withhold information. Recent occurrences have shown that figures are not the strong point of the Superintendent of the Government Gardens, but should he ever publish the results of his experience, we would suggest the following as a sample of those questions about cinchona cultivation that urgently need replying to. What is the relative mortality in trees shaved from, say, their fourth year, and those left intact for coppicing ? What are the relative profits of the same on a given area ? What manures (if he has tried any) have increased the alkaloids and the growth of the trees ? Has he discovered any prophylactic against canker, or any cure for it when once it has set in ? We could increase the list considerably if we thought there was much prospect of any answers being elicited. This is one of the things they manage better in Ceylon, for Dr. Trimen, of the Royal Botanic Gardens, is always ready to supply information to the public. He has not, however, the unrivalled opportunities of his Madras colleague on this subject. We may here draw attention to a paper by Mr. Hamilton, in a recent number of the *Tropical Agriculturist*, on the preparation of bark for the London Market. As a member of a firm of produce brokers his opinion should carry some weight, and he thinks that sufficient care is not taken with curing, sorting, and packing the different varieties. A great deal of rubbish is also sent home, which really does not pay its expenses. Twig bark, for instance, has been selling for about a penny a pound lately, and as it does not cost much less than an anna to land, there is bound to be a loss on it. To be worth harvesting it should be sold locally, and the establishment of a manufactory at Calicut, such as was lately proposed, would be a great benefit to planters.

As to the general prospect of cinchona growers in India, we believe them to be hopeful. The Ceylon men have cut down immense quantities to help them with their tea extension, and, as far as we can learn, are not replanting ; the South American bark has almost ceased to be exported ; the Java production is certainly not increasing, and it seems as if the industry was not going to be a success there. A powerful Association has, as we recorded some weeks back, been formed in the States to drive English and German made quinine out of the country. Its members have determined to manufacture enormously, and to undersell the foreign product, even if they have to work at a loss for a time. Of course, they are flying in the face of political economy, but they are bound to have bark, and, as the present supply is not more than sufficient for current requirements, prices ought to rise.—*Madras Mail*

THE SWEDISH METHOD OF BUTTER MAKING, OR HOW SWEDISH EXPORT BUTTER IS MADE.

[*Prepared by a Professor of Agriculture in one of the Swedish Colleges.*]

CLEANLINESS.

One absolute condition of obtaining good butter is that the greatest care be taken to preserve cleanliness, both in the milking and during the whole operation with the milk and butter. This also applies to the vessels and utensils that are used in the dairy.

THE FODDER.

The fodder that is given the animal must be fresh and good, if rape seed cakes [*rapskakor*] (at the most one and a half pounds per day to each animal), bran or oats, bolted; these tend to increase the flavor and fine quality of winter butter.

THE QUALITY OF THE MILK.

The milk that is to be used in the dairy must not be mixed with that from sick cows or dry cows; and the milk should not be used in the dairy until the sixth or seventh day after calving.

THE MILKING.

At the milking, care must be taken that the udder is well wiped with a dry towel, and that the milkers have perfectly clean hands; also that these do not dip in or come into any contact with the milk. Dunging must not be undertaken during the milking.

THE TREATMENT OF THE MILK BEFORE SKIMMING.

The milk must be removed from the place as soon as possible, and in the summer be exposed as little as possible to the heat of the sun. Directly after the milking it should be strained through a close linen cloth, or still better, a fine wire sieve. When the milk has come into the dairy, it is best if it can be separated immediately, for the sooner this is done the better, and the butter will keep longer. If it is not possible to do this, and should the milk, from some cause or other, have to stand for some time before the separation occurs, the place in which the milk is kept ought to be well ventilated, so that good and fresh, as well as dry air, prevails there; this also holds good throughout the dairy. The ventilation is to be secured by means of large ventilators, both at the floor and roof. During the warm season of the year, if the milk is kept 12 hours or more before the separation can take place, it ought to be cooled in water or ice. If the temperature of the milk has for some cause or other gone down below 77 degrees, the milk, directly before the separation, should be heated to 77 degrees Fahrenheit. Immediately after the separation, the cream should be cooled, in ice by preference. The more thoroughly the cream is cooled, the finer will be the butter and the longer will it keep.

THE SOURING OF THE CREAM.

Eighteen or twenty hours before the churning, the cream must be heated to 60 or 70 degrees: in the winter higher, in the summer lower; poured into the [*graddtunnan*] cream vessel, and set with 2 to 5 per cent buttermilk or sour cream, from a previous churning. One regulates the degrees of temperature and the souring ingredients [*syretillsatsen*] so that the cream directly before the churning has its right sourness. In order, during the whole souring time, to keep the temperature somewhat equal in the cream vessel, one surrounds it in the winter with straw or the like, for the temperature in the cream barrel must never sink below the churning temperature, and neither is it well to heat the cream above 74 degrees. For the heating of the cream one puts it in tin pans [*bleckkannor*], in water of 105 degrees, not higher, and stirs [*rores*] it constantly until the cream has reached the right temperature for souring. This can also be accomplished with a so-called cream warmer of tin, which, filled with water of 105 or 120 degrees, is moved around in the cream until it attains the proper temperature.

The greatest attention ought to be given to the cleansing of the cream barrel, and it ought always after every souring to be extremely well scalded with boiling water or steam, as well as to be well aired and dry before use, otherwise the butter will get a tang [*bismak*]. It is, therefore, most suitable for one to have two cream kegs, and use each every other day. In order to keep the curds [*syran*] constantly fresh, one prepares them at the farthest once or twice a month, and, for the rest, immediately, if any remark has been made against the butter, for with the old curds [*syra*] the defect is transferred from one churning to the other. New curds [*syra*] are prepared in the following way. Twenty pounds fresh milk are heated to 95 degrees Fahrenheit, and kept in a stone jug, which is placed in a box or the like, filled with hay and covered with a lid, so that the temperature is maintained; after four hours, when the milk is generally already sour, it is well stirred, so that all the cream that has formed is mixed in, after which one allows it to stand twelve or fourteen hours longer, during which one now and then stirs the milk vigorously so that no thick lumps are formed; then the curds [*syran*] are ready for use. Should they not be used immediately, they must be kept in ice water. This quantity of curds is sufficient for the souring of 400 or 500 pounds of cream. During the first three hours of the souring one stirs the cream a few times. But afterwards it must stand untouched until a half-hour before the churning, when it must be thoroughly stirred. Through this it obtains an extremely sour taste. It is better to have it rather too strong than too weak, for otherwise the butter will acquire a flat and, most frequently, a bitter taste.

Then the soured cream is cooled to 50 or 60 degrees higher in the winter, lower in the summer, and then strained in the churn, which has before been rinsed out with water of a corresponding temperature. The best churns are the so-called Holstein. The churn, ought not to be filled more than half or two-thirds full of cream. Before the churning begins a suitable quantity of coloring matter is put in the churn, so that the butter gets a faint tinge of straw-color. One must take care in the pouring in, that the coloring matter does not come to the wood in the churn, as the color would then easily become uneven. The coloring matter must always be regulated by the quantity of milk from which the cream has been obtained, and a suitable coloring ingredient is 2·5 to 5 grains for 100 kilos of milk, that is, 35 to 70 grains per 200 pounds according to the season of the year, and the demands of the market. Then it is churned with such speed that butter is obtained in from thirty to forty-five minutes, and this is regulated by the temperature and the speed of the churning: high temperature and quick motion yield butter soon, a low temperature and slow motion the contrary.

When the cream has returned, the churning is interrupted for a few seconds, and the cream that has dashed up on the lid and sides of the churn is rinsed down with water or skim-milk of the same temperature as that which prevails in the churn. Then it is churned more slowly, in order to get the small flakes or pellets of butter to collect, and now it is of great importance that the churning is stopped in the right time. If one breaks off too early, less is obtained, and if one churns too long, the butter becomes overdone. When the buttermilk separates itself, clear, from the pellets of butter, and these are scarcely the size of a pin-head and have a rough surface, it is time to stop.

The greatest care ought always to be devoted to the cleaning of the churn; it should be carefully rinsed every day with boiling water, and afterwards aired and well dried in the open air. Churns that are not perfectly dry often give the butter an old taste. If one can steam the churn once a week, this is particularly suitable.

The butter, when ready, is taken out of the churn with a hair-cloth sieve, washed in one or two waters, whereupon the buttermilk is pressed out through working over with the hands. Then the butter is weighed and mixed with 2 or 3 per cent of good salt, the best Lunneburger, which is kneaded in with the hands. In working over with the hands the butter must never be rubbed, but only pressed. Then the butter must lie one or more hours, until it has got some firmness, then it is worked over in a kneading machine, or on a kneading board. In the summer it is suitable to let the butter, before the last working over, lie in a so-called refrigerator, through which it obtains greater solidity. The refrigerator is made of beech wood, 14 inches high, 20 inches wide, and sufficiently long to contain the butter desired. The butter is laid on a wooden trellis [*transriflor*, ½ inch thick, 2 inches broad, that is placed across the bottom of the box on cross pieces on the long side one inch from the bottom. The box is also covered with a lid, which consists of a box three or four inches high, of zinc, in which pieces of ice can be laid. In the ice-box, or refrigerator, the butter lies in cold air, and, through this, acquires still greater solidity.

THE PACKING OF THE BUTTER.

As soon as the butter is ready, it is put into firkins, in which it is packed down closely with a wooden pestle, so that no apertures are left in the butter. When the firkins are full, the surface is smoothed with a wooden spade, covered with oil-cloth and strewn with a layer of fine salt one-half inch thick. The firkin is well rinsed with water before use, rubbed on the sides and bottom with salt, and kept as clean and white outside as possible. The whiter and more sweet the firkin is the more desirable the butter in the market. Firkins of red beech are, on this account, unsuitable. On the lid of the firkins must be placed the trade mark of the dairy.—*Farmers' Review.*

THE MOREL.

It may interest the readers of the *Indian Forester* who are fortunate enough to possess fine palates, to know that the morel (*Morchella esculenta*), an edible fungus which rivals the truffle in delicacy of flavor, is common in Jaunsar, and was found by me in abundance in May last in that portion of the *Deora* Gad deodar forest belonging to the Keuntal State, which suffered so severely from fire last year. The paharis set great value on it, and eagerly gather all they can find.

The following is the account of this fungus in the *Treasury for Botany*, where a good illustration of the plant is given:—

"Morel is the common name of *Morchella esculenta*, which, under a variety of farms, occurs in various parts of the world. *It is occasionally plentiful in this country*, but the greater part of what is sold by the oilmen comes from Germany. A large quantity is collected in Cashmere. As it dries very readily, and may be kept for some time, it is much used by cooks to flavor gravies. It is also dressed in various ways when fresh, and makes an excellent dish if stuffed with finely minced white meat. When plentiful it may be advantageously employed instead of mushrooms to make ketchup. Morels are particularly fond of burnt soil, and the collection of them is so profitable to the peasants in Germany that they were formerly in the habit of setting fire to the woods to encourage their growth, till the practice was made punishable by a special law. *M. semilibera* may be known from the common morel by the border being quite free for some distance. It has a bad reputation, and requires, therefore, some caution in its use. The genus *Morchella* is distinguished by a deeply pitted naked head supported on a peduncle. The depressions are sometimes regular, but occasionally they assume the appearance of mere furrows with wrinkles like interstices."

N. Hearle.

—*Indian Forester.*

PLANTING ENTERPRISE IN JOHORE—EUROPEAN AND NATIVE.

When Mr. Hole, private secretary to the Maharaja of Johore, passed through Colombo on his way to this country with his Highness, he was interviewed by a reporter from one of the local papers, and in due course publicity was given to what purported to be his opinions regarding the past, present, and future of Johore. The European planters on the Pulai range have always acknowledged the encouragement and substantial help afforded to them by the Maharaja, but they were hardly prepared to find his private secretary announcing to the world that hitherto European enterprise had been practically a failure so far as the planters are concerned, and a source of loss instead of profit to his Highness. One of them takes up the cudgels on behalf of his class, and writes as follows:—"It is true enough that coffee Arabica, of which Mr. Watson was the pioneer, has proved a failure, but Liberian coffee has taken its place, and will ere long more than recoup all the losses incurred on the other. No one has done more towards bringing this about than Mr. Watson has, and at the present time no one has a larger stake in the planting enterprise in Johore. While the Maharaja has given every encouragement to the European planters, he has given equal, if not greater, facilities to the Chinese gambier and pepper planters, who, while they saved the revenue of the country by the taxes on gambier, pepper and opium, on the other hand are doing incalculable damage by the indiscriminate manner in which they carry on the cultivation. For miles on every side of Johore Bahru there is little or no forest to be seen now, where some twenty or thirty years ago there was nothing but heavy valuable timber. Now there is nothing but long stretches of lalang grass, with patches of scrub and a few strips of jungle near the few gambier and pepper gardens left in this locality. Now all this is caused by the gambier and pepper cultivators who made off to fresh land further afield as soon as they found their gardens falling off in yield, instead of applying manure. From the top of any hill you will see innumerable park like glades which are very pleasing to the eye at a distance, but on closer inspection they turn out to be cultivated and abandoned gambier and pepper gardens, the abandoned ones being overgrown with lalang grass and are in proportion of at least 2 to 1 of those in cultivation. To enable you to understand how this state of things comes out, I will try and explain the system pursued by the Chinese gambier and pepper planters. When a Chinaman wants to open a garden he generally goes off to one of his countrymen in Johore or Singapore, enters into an agreement with him to the effect that the merchant advances money, food and opium to the planter from time to time, taking good care not to let his advances exceed, say, two-thirds the value of the garden. The planter for his part has to sell all the produce of his garden to the merchant at a fixed rate, which rate is always considerably below the real market value. You can, therefore, understand that the profits of the merchant are enormous, and that the planter is generally in debt. The gardens as a rule, are from 8 to 10 acres, which are planted in the following proportions, viz., about 1 or 2 acres of pepper vines and the balance with gambier. The forest is felled and burned off as for coffee, the place intended for pepper is dug up and prepared most carefully, pepper cuttings planted about 8 feet apart, and a jungle post about 10 feet high sunk in the ground beside each plant, to which it is eventually trained. The balance of the clearing has very small holes cut about 6 feet apart in which young gambier plants are put and left to fight it out with the lalang grass, ferns, and other weeds, which soon spring up. In eighteen months from planting the gambier gives a return which helps the planter to pull along till his 1,000 or 2,000 pepper vines begin to give crop when 3 years old. On each side of a gambier and pepper garden there is a reserve of forest 8 chains wide, in which he has the right of cutting any timber he may want for posts for his vines, firewood for boiling down his gambier, or for making burned earth, which, with the refuse from the gambier boilers, is the only manure applied to the pepper vines when the garden is any distance from a town. If a little more care was given to the gambier, there can be no doubt that, not only would the returns be greater, but the garden would last much longer—the gambier being generally worn out long before the pepper begins to fail. As soon as the planter finds that the pepper is giving out, he looks about him for another piece of forest and starts afresh. If this kind of cultivation is allowed to grow unchecked it is only a question of time, and that of no great length, before the whole of the valuable forest in this country will be destroyed. The rise in price of pepper some months ago has given a great impetus to the opening up of gardens.

"The only remedy I can see to stop the destruction of so much valuable timber would be to try and induce the planters to grow their pepper vines on trees planted for the purpose, such as dadap, cotton tree, &c., and they might also be bound down to cultivate their gambier, at least to the extent of keeping out the lalang, and if the land was to be abandoned, the planter should be bound to plant a certain quantity of forest trees on it. It is a well-known fact that pepper grown on live trees, such as dadap and cotton is much more lasting, costs less in cultivation, and gives more crop than it does grown on the jungle posts; and that the gambier would be all the better for a little more cultivation is also certain. When land has been "chenaed" in Ceylon it certainly deteriorates; but not to the same extent as the land here after gambier and pepper has been grown on it. In the former case "cheddy" soon grows up and eventually jungle trees, but when the lalang grass once gets hold of the land, nothing will grow in conjunction with it.

"I am glad to see Mr. Hole spoke favourably of tea in Johore. The gentleman who is carrying out the experiment of making Oolong tea in the Formosan fashion for the American market has just brought down some more men from Amoy, also boxes, lead, paper, and in fact everything required to turn out tea similar to the above. As soon as Indian labour is available, however, I fancy he will revert to the Indian method, as there is no comparison between the cost of preparation with Tamil and Chinese. Indian labour will be available very soon now, as the labour question is virtually settled, and Johore will be able to get Indian labour on the same terms as Singapore and the protected native States. Mr. Hole would have been more correct had he said that the construction of a railway *was contemplated*. So far only a flying trace has been made for about 10 miles out of Johore Bahru in the direction of Gunong Pulai. If the proposed railway is made, it will open up a most valuable tract of country for planting purposes, and at the same time the splendid timber will be made available."—*Planters' Gazette* English (*Paper*).

ANTS ON TREES AND PLANTS.

The ants so often found in great numbers upon plants and young fruit trees cause no injury. Their presence is due to plant lice, a very peculiar insect found upon nearly every part of plants, but usually in the greatest numbers upon young shoots, buds and leaves. These parasites multiply with wonderful rapidity. It has been proved by Reaumur that a single individual is capable of becoming the progenitor of nearly six thousand millions of these pests in five generations. This accounts for the fact that the tender twigs and leaves of plants and small trees will often become completely covered with a living mass of these minute lice in a very short space of time. Most of these are females, destitute of wings. The winged individuals, according to Harris, "appear only at particular seasons, usually in the autumn, but sometimes in the spring, these being all small males and larger females. After pairing, the latter lay their eggs upon or near the leaf-buds of the plants upon which they live, and together with the males soon afterwards perish." The genus to which plant lice belongs is called Aphis, from a Greek word signifying to exhaust. The eggs are hatched in the spring and the young lice immediately begin to exhaust the vitality of the plants by sucking the sap from the twigs and leaves. They increase rapidly in size and soon mature, and it is a remarkable fact that the entire brood, without a single exception, are wingless females and in condition to propagate their species. Their young, however, are produced alive, and each female may be the mother of fifteen or twenty young lice in a single day. The second generation also consists of wingless females, which grow up and have their young in due time, and thus brood after brood is produced to the seventh generation, or even more, without the appearance of a single male, but the last brood in autumn consists of males and females, upon which wings are developed, the eggs being laid by the females as before mentioned, and remaining upon the twigs until the following spring, when they are hatched and their work of destruction begins. The leaves and bark of plants much infested by these insects are often completely sprinkled over by a sticky, sweetish fluid discharged by them, which upon drying turns dark, greatly disfiguring the foliage. This sweetish fluid is what attracts the ants, which are very fond of sweets of all kinds. The ants are very careful not to injure or disturb the lice, which they treat with remarkable gentleness. Probably the most effective remedy for plant lice is strong soapsuds, which can be applied in the same manner as for cankerworms by means of a garden pump. Some fruit growers use a decoction of tobacco with the soapsuds, which makes the remedy much more effective. Care must be used not to make the solution so strong as to injure the plants. This can be determined by experimenting on a small scale. When the plants and trees are so low as to be within easy reach, the suds can be placed in a broad, deep dish, and the twigs bent down and immersed in them. Young fruit trees should be carefully watched this season of the year, and upon the first appearance of the lice means should be adopted to exterminate them before they have time to multiply extensively.—*American Cultivator.*

ARBOR DAY IN AMERICA.

The practice of tree planting by private individuals, and associations has been taken up with much energy in the United States, and is likely to result in widespread public benefit. In Ohio, a State Forestry Association, which has been taken as a model for similar associations in other parts of the country, has been organised for the purpose of stimulating and developing public interest in arboriculture. The State Legislature has taken up the matter, and in 1883, a Government proclamation was issued setting apart the fourth Friday in April of every year as a public holiday, to be called Arbor Day, and to be devoted to the systematic planting of trees and groves in all suitable places. These measures have been rendered especially necessary in Ohio, where neglect and destruction of the forests have been allowed to continue for many years. It is intended that the State Forestry Association shall form the centre of forestry associations in every city, town, village and school in the State, whose object shall be to plant trees along streets, by the road sides, in parks and commons, around public buildings, and in waste places; to distribute information concerning trees and forest among the people, and to encourage tree planting in every possible way. The celebration of Arbor Day forms the subject of an interesting pamphlet issued by the Department of the Interior, Washington, in which is to be found much information both practical and historical, and a valuable letter by the late Dr. F. B. Hough.—*Indian Forester.*

ELECTRIC SUGAR REFINING CO.

Synopsis of the report made by Mr. Wm. S. Levinses on the weights of the sugar treated at the demonstration of the process on the 14th July, and of the analysis of the raw sugar used.

1. He certifies the purchase of the sugar as—six tons Jamaica sugar from Messrs. Warner, Tobias & Co., on the 3rd June, which he had put into bags of about 100lbs. each for the convenience of handling. The description is known as Muscovado.

2. On the 9th July, 1885, he accompanied Mr. H. J. Abbot, United States Government Appraiser of Sugars for the Port of New York, and examined 120 of the said sugars, while Abbot took therefrom a fair average sample for analysis.

3. The sample analysed as follows:—

Cane sugar	88 70
Invert sugar	3 30
Soluble ash	0 55
Insoluble ash	0 30
Organic matter	1 40
Water	5 70
	100 00

4. On the 13th July he took 84 bags of the 120, and delivered them at the house of Professor H. C. Friend. Prior to their being removed from store, they were weighed by a sworn weigher in lots of 10 each, and their total weight was 8,030lbs.

5. That after the demonstration he attended at the house of the said Friend and weighed the contents of 40 barrels of refined sugar, which stood in his dining room, and found that the aggregate net weight of the same was 6,565lbs.

6. That at the same time he weighed the bags of raw sugar which had not been used and also the empty bags, the contents of which had been refined, and he found the aggregate weight of all to be 880lbs.

From the foregoing statement it will be observed that the weight of the raw sugar taken to Friend's house was ...	8,030lbs.
From which deduct the amount left in bags and the weight of the empty bags	880 ,,
Leaves as the amount treated	7,150lbs.
The weight of the refined returned was	6,565 ,,
Consequently the loss was	595lbs.

Or a small fraction more than the amount of the saccharine matter which, per analysis, was shown to be in the raw sugar. The analysis shows—cane sugar 88 70 per cent, and invert sugar 3 30 per cent, or in all 92 per cent saccharine matter.

JAMES U. ROBERTSON

5, Baltic Buildings, Liverpool, 4th August 1885

—*Sugar Cane.*]

A BURMAN POSSIBILITY.

The subject of developing the mineral resources of the province has oftener than once been adverted to in these columns The capabilities of the country place the desirability of such advancement beyond question Practical suggestions and not theoretical investigations are what is most needed to secure the desideratum. The tin mines of Perak in course of a decade's systematic working under professional guidance or control have increased the public revenues of that "Protected" State, or appanage of the Crown, by over a million dollars, the income to the said exchequer being now nearly a million and a half dollars from this *one* source alone. But this growth of the Perak tin mining industry is not exceptional. The other protected states along the Malayan coast line have done, *pro rata*, equally as well; and even the Siamese dependency of Queddah, which is conterminous with British territory, yields corresponding results. The success of the Dutch operations in Banca and Billeton in the same branch of metalliferous mining is without a parallel as regards European intervention in such industries in the East. The *native* working of the stanniferous deposits of Sumatra has also proved successful in being more profitable to the Sumatra Malay than the slower returns from precarious agriculture or other avocations. Under these circumstances we are at a loss to understand why the same department of industry should be an egregious failure in British Burmah. We are aware of the attempt made by a well known local firm to turn the Mergui tin deposits to good account. We are aware, also, of the causes that induced a negative result. Innovations are to be deprecated which neither suit the country nor conditions of working. Expensive machinery and highly paid establishments are not wanted in the nascent stages of any industry with the probabilities of success as yet unassured. The plan bound to operate best is that of utilising indigenous resources to the furthest 'Guidance' and not 'change,' is best suited to the temperament of the Asiatic laborer. Improvement in methods of working must be gradually effected under a process of time and example. The means and appliances should be within the ability and ken of those for whom they are intended. The way to meet the end is embodied in the word *encouragement*, which can only be effected through professional skill and experience—to attract as well as to instruct indigenous or imported labour. That is as much required as technical knowledge. The Asiatic is suspicious of gratuitous advice, and opportunity must be found for giving him the requisite hints,—some times by precept, and on other occasions by example, for the improvement of his rude system of working. He will be led, not forced; and his conservatism will soon give way to interest. We are assured that it is only by attention to such factors as these (above enumerated) that mining has ever become a success in the East, while in the instances when they have been ignored or neglected, the outcome has invariably been loss and failure.—*Rangoon Gazette.*

NOTES ON TEA.

[By Percy Swinburne, late of Sylhet, Cachar, and Assam.]

Manufacture Withering. The old method of withering was to spread the leaf 2 to 3 inches thick on a machan, and to turn it over several times during the night to prevent its heating too much. In wet and cold weather it was placed in small quantities at one time, on a machan, over the firing chools, where the heat quickly softened and prepared it for rolling. But now great improvements have been made in the factory buildings and accommodation. It is generally recognised that the leaf must be thinly spread out, and the withering process most carefully conducted to turn out good tea Withering sheds admitting air and light freely, and fitted with tier upon tier of bamboo trays, are made Large pucka iron roofed tea houses are fitted with lofts for withering, and arrangements are made for regulating the heat and admitting or shutting out the air.

Natural withering, as generally understood, means that the leaf is placed in open or closed houses in which the draught of air may be regulated, while artificial withering includes the use of heated air, or of machinery.

A large proportion of the best tea which is sent to the market is now made from artificially withered leaf, that is to say, from leaf which has been withered by heated air The lofts of the pucka tea houses are heated by the sun, to a temperature of over 100 degrees, and are often intolerably and suffocatingly warm. In dull and wet weather also, the temperature in these places is still considerably higher than that of the surrounding atmosphere as they are heated by siroccos or other firing machines, the chimneys of which pass through them

There has for a long time been a strong prejudice against artificial withering Closed hot houses were used because the withering, under favourable circumstances, is always supposed to give the best results.

In natural withering, the faster the process the better the result, so we may conclude that perfect withering would consist in removing all superfluous water from the leaf instantaneously, without disturbing the oils juices, &c, while sufficient heat was applied to reduce the fibre to the soft condition required for rolling.

A series of careful experiments have been made in a small house heated by smoke flues, with one maund of leaf spread on about 15 square feet to a pound It was found still, that the faster the operation the better the result. That the greater the heat, the thinner the leaf must be spread, and the more care and nicety required

The finest tea was made from leaf withered in 3 hours, at a temperature of 140 degrees The tea was on several occasions carefully assorted, and true samples of the bulk were sent down to Calcutta to be valued, and the quality of the liquor as well as the appearance were pronounced excellent. The average valuations were about 14 annas, and the leaf was good, but not finer than that plucked on most estates in Darjeeling, or Sylhet, or Cachar, being two leaves and a bud. The market at the time was depressed, and the average price of the teas of the districts named was, at that time, between 9 and 10 annas

In 1883 the entire crop of the Kalnagar Estate, Sylhet, just under 900 mds. was withered in hot houses, heated by smoke flues, and realised 11 annas per lb. average The houses were "kutchee" ones built of bamboo and plastered ekur. They were 14 feet high in the roof, 7 feet high walls, breadth 20 feet. Two four feet wide, passages and 4 rows of chalnies 3 feet wide.

The pipes were 9 inches in diameter, and ½ inch thick, and ran along both sides of the house underneath the outer row of chalnies The heat was much greater near the furnaces than at a distance from them, and the house gets thoroughly heated for a distance of about 15 to 20 feet only from the furnace.

The heat is also uneven, and the greater it is the more difficult it becomes to equalize the withering. The leaf must be thinly spread and carefully watched One part of the house wither much more quickly than another, and if the leaf is left for an hour only, after it has reached the right stage, much quality is lost.

These houses, defective as they are, are preferred to those of the old style.

When the men have learnt how to arrange the leaf, and work the fires, the rolling can be commenced at 5 A.M., every day, in all weathers

The leaf does not turn red unless it is bruised in some way during the withering process, and its juices become exposed to the air. This may happen from the leaf being gathered up a second time, and removed from one place to another.

If it is once established beyond dispute that the best tea can be made from artificially withered leaf, there should be no difficulty in making a hot chamber in which the leaf could be very thinly spread out and the heat equalized and regulated, and the moisture removed.

One of the great disadvantages of open houses is, that the damp cold air which checks the withering is admitted, as well as the warm air which favours it. Withered leaf absorbs moisture, and is refreshed by it—as a bouquet of faded flowers is revived by sprinkled water. But when the leaf has withered a second time, it loses its freshness, and when the flowers have again faded, they begin to give out an offensive smell; the first stages of decomposition having set in in both cases. Leaf which has once lost its volatile freshness and delicacy, never recovers it, and can never be converted into fine tea.

The fine qualities in the leaf may be chemically altered in the hot withering process, but they are not lost altogether as is proved by the quality of the tea produced by it.

In the same way, however, as the flavour of the tea is affected by different firing processes, so it is probably also affected by the degree of the heat applied in the withering, as well as by the manner in which it is applied.

Good tea can be made of leaf which is carefully withered, rolled, fermented, and finally baked out, although strong, it is peculiar, and has not the delicate flavour and smell of tea, which is roasted over charcoal in the usual way, and this again is not so aromatic in flavour as that which is dried by the rapid hot air draught of the "Sirocco"

It would appear that the best withering would be accomplished by a strong draught of moderately warm and quite dry air passing over the whole surface of the leaf.

If the juices can be kept uninjured, the more the leaf is withered, the better the quality of the tea The presence of water in the rolled leaf appears to affect the fermentation injuriously It is not accurately known at present what chemical changes take place in the various systems of manufacture, but we know that we are more or less dependent on the weather, and that the changes which take place satisfactorily one day, will not do so on another, under apparently exactly the same condition. Lightly withered leaf makes tea without strength or body, and this is probably due to the presence of too much water in the rolled leaf which causes an injurious fermentation On the other hand, over withering, or bad withering, by which the juices have been injured or destroyed have the same effect and produce weak pale liquored tea.—*Planters' Gazette* (English Paper)

A SKILFUL SURGICAL OPERATION.

The American Ambassador at Vienna, Mr Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billorth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one third of the organ and, strange to say, the patient recovered—the only successful operation of the kind ever performed The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms —The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "all gone sensation, a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste Food fails to satisfy this peculiar faint sensation; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow, the hands and feet become cold and sticky—a cold perspiration The sufferer feels tired all the time, and sleep does not seem to give rest After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times, the blood becoming thick and stagnant, and does not circulate properly After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often times there is a palpitation of the heart, and the patient fears he may have heart disease Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomes closed, or nearly so Although this disease is indeed alarming, sufferers with the above named symptoms should not feel nervous, for nine hundred and ninety nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner The safest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A J White (Limited), 17, Farringdon road, London, E C This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

St. Mary Street, Peterborough
November 29th, 1881

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr. A. J. White. William Brent.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing All who have tried it speak very highly of its medicinal virtues, one customer described it as a "Godsend to dyspeptic people. I always recommend it with confidence —Faithfully yours,

(Sd.) Vincent A Wills,
To Mr. A. J. White. Chemist Dentist, Merthyr Tydvil.

Seigel's Operating Pills are the best family physic that has ever been discovered They cleanse the bowels from all irritating substances, and leave them in a healthy condition, They cure costiveness

Preston, Sept. 21st, 1883

My dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully, in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.

I am, dear Sir, yours faithfully,
To A J White, Esq (Signed) W. Bowker.

Spanish Town, Jamaica, West Indies, October 24, 1882.

Dear Sir,—I write to inform you that I have derived great benefit from "Seigel's Syrup" For some years I have suffered from liver complaint, with its many and varied concomitant evils, so that my life was a perpetual misery. Twelve months ago I was induced to try Seigel's Syrup, and although rather sceptical, having tried so many reputed infallible remedies, I determined to give it at least a fair trial. In two or three days I felt considerably better, and now at the end of twelve months (having continued taking it), I am glad to say that I am a different being altogether It is said of certain pens that they "come as a boon and a blessing to men," and I have no reason to doubt the truthfulness of the statement I can truly say, however, that Seigel's Syrup has come as a "boon and a blessing" to me. I have recommended it to several fellow sufferers from this distressing complaint, and their testimony is quite in accordance with my own. Gratitude for the benefit I have derived from the excellent preparation, prompts me to furnish you with this unsolicited testimonial.

I am, dear Sir,
Yours ever gratefully,
(Signed) Carey B. Berry,
A. J. White, Esq. Baptist Missionary.

Hensingham, Whitehaven, October 16, 1882.

Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) John H. Lightfoot.

THE TROPICAL AGRICULTURIST:

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THE

INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE, MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA.—SATURDAY, OCTOBER 10, 1885. [No. 41.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 30TH SEPTEMBER 1885.]

Madras.—General prospects fair. Much improved in Bellary and Anantapore. Small-pox, fevers, and cattle-disease are reported as generally prevalent in all districts.

Bombay.—Good rain in all the districts of the Deccan and Southern Mahratta country. More rain urgently required throughout Guzerat, where crops are withering and in parts of Khandesh, sowing of *rabi* crops commenced in most districts of the Deccan and in parts of Bijapore and Belgaum. Fodder scarce in the eastern talukas of Belgaum and Dharwar. Standing crops damaged by rats, worms, and storms in parts of Hyderabad, and by drought in parts of Kurrachee. Cholera in parts of sixteen, and fever and cattle disease in parts of ten districts.

Bengal.—Rain in all districts during the week. Prospects of crops are good, except in the flooded tracts in the Burdwan and Presidency divisions, and in Behar, and also on the sea coast of Orissa, where cyclone of the 22nd instant caused great damage. *Bhadoi* crops, where not injured by floods, are being harvested with fair results. Price of rice continues high all over the province. Fever is prevalent in some districts, but public health, on the whole, is fair.

N.-W. Provinces and Oudh.—Rain has fallen generally throughout the provinces, but more is needed in some places. *Kharif* crops have benefited from the rain, and harvesting operations have begun in a few districts. Prices are steady, and prospects on the whole good. Cases of cholera and fever continue to be reported, otherwise public health is fair.

Punjab.—No rain. Fever in the Hissar, Delhi, and Peshawur districts, and in the Kahuta tehsil of the Rawul Pindee district, elsewhere the health is generally good. *Rabi* operations in progress in the south-east. Prices on the whole steady.

Central Provinces.—Prospects much improved by recent rain, but more is still required, especially in Nimar, where fall is much below average. Prices steady.

British Burmah.—Cholera slight in four districts, elsewhere public health good. Cattle disease severe in one district, slight in three districts, elsewhere health of cattle good. Crop prospects good.

Assam.—Weather fair. Fever prevalent, cattle disease still reported from some mouzahs. Ploughing operations commenced for sowing *matti kalai* and mustard. Prospects of all crops good.

Mysore and Coorg.—More rain needed everywhere. Standing crops withering in Mysore district and backward in parts of Kolar district, but in Tumkur district they are reported to be reviving in localities where rain fell. Outturn of irrigated *ragi* in Tumkur district poor. Cattle in poor condition. Water supply sufficient for the moment. Prospects of the season reported good in Malnad taluks of Kadur and Shimoga districts, and less gloomy in Mardan taluks. Improving in Bangalore and Tumkur districts. Fodder scanty. Public health generally good, except in parts of Tumkur, Kadur, and Shimoga districts, where fever prevails. Prices slightly rising, except in Shimoga and Kolar. The recent rise in Shimoga reported last week due to exportation to Bellary. Speaking generally, the rain has done good, and the outlook is a little less discouraging than it was last week.

Berar and Hyderabad.—In the Akola and Julgaon taluks prospects have improved, but more rain is required. Crops on other taluks in good condition. Rain has been beneficial to standing crops. General health fair. Prices—wheat 13½, coarse rice 12½, white *juari* 17, yellow *juari* 21, and *tur* 14½ seers per current sicca rupee.

Central India States.—Weather clear, with cool nights. Prospects of crops improving. Prices stationary. Health good.

Rajputana.—Crop prospects fair. More rain wanted. Two cases of cholera in the city amongst pilgrims, fever at Sujangarh, otherwise health generally good. Prices stationary. Weather clear.

Nepal.—Prospects good.

Letters to the Editor.

ORANGE CULTIVATION.

TO THE EDITOR.

SIR,—Having read your correspondent "T's" letter, and your note on this subject, in a recent issue of your paper, it has occurred to me that you have under-estimated the average price of oranges in the Calcutta market. It is true that you *can* get oranges at four annas the score, but that is an exceptionally low rate, and applies to fruit of inferior quality, for it is seldom that you can get *good* fruit at that rate. I have myself bought them six to twelve annas the score. When selling the produce of the trees in my garden, I have invariably realised eight annas per score. Of course, it must be remembered that the fruits from my trees were of superior quality. The variety I cultivate is the 'Sylhet,' but I have also the "Cintra" of the Punjab, which, though it yields splendid fruit, is not such a heavy cropper down here. In the Delhi district it grows to perfection, and the fruit attains a very large size. I have seen trees literally covered with fruit, so much so, that branches have given away with their load of fruit, a large portion of which had to be removed before ripening, to save the trees from perishing through exhaustion, and being torn down with a superabundance of fruit. The plan you recommend for cultivation is the one I myself have adopted for many years. There is nothing like well-decayed night-soil, cow-dung, and common black "tank" soil, with an admixture of slaked lime, or old mortar finely powdered, for growing the orange in. In fact, orange trees planted entirely in old mortar have been known to yield excellent crops.

It may not be out of place to mention that the *very best method* of raising orange trees, is by budding. It is the quickest, surest, and most economical. By seeds, you are apt to get plants yielding indifferent fruit, as I have found from experience. You may, perhaps, get 10 per cent good plants, but then you have to wait for many years to make your selection. Whereas, by budding, you are *certain* of your variety, and the plants thus raised, invariably fruit the third year. I have found the common lemon or *khatta*, as it is called in Upper India, the best to use for stocks to bud upon. These are raised from seeds, and are ready for budding upon in February. The sweet lime, or *meeta neeboo*, is said to make a good stock also; and it is alleged that the fruit of trees budded on these are sweeter than those on the *khatta* (literal, sour). I have, however, not been able to detect the difference. I have seven *beegahs* devoted to orange cultivation for the market, and I get an average yield of Rs. 200 per *beegah*. My trees are planted *ten* feet apart, but I think they are too close. As 3⅓ Bengal *beegahs* are equal to 1 acre, my average revenue will be equal to Rs. 700 per acre. My annual expenses do not exceed Rs. 200, so that I have a clear profit of Rs. 600 per acre.

Another point which I think worth mentioning is, that I change my stock of fruit-bearing trees after three years of full bearing. After 13 years' experience in the cultivation of the orange, I have found that when trees bear their full crop for three successive years, they begin to die off most unaccountably. I can assign no *scientific* reason for this; but I have come to the conclusion that, by having a stock ready in the nursery, and planting out between the old trees from the time they first begin to fruit, there is always a fresh lot of trees ready to replace the old ones from the year they begin to show signs of dying off. Thus, you avoid the risk of losing your revenue even for a single year. The extra expense is trifling, and the gain much. If your correspondent "T" intends going in for orange cultivation on a remunerative scale, he should bear this last fact in mind. For, although I have seen orange trees live to a good age, I have not known them to fruit satisfactorily. In the Goorgaon district, Delhi division, are to be seen *miles* of orange plantations; and I candidly confess that, *nowhere* in India have I seen this delicious fruit grown to greater perfection, although apparently little or no care is devoted to its cultivation. The fruit is there sold by the *maund*, and I have myself bought them at Rs 4 to Rs 6 the maund. In these plantations I have seen very old trees; but they had a gnarled and "seedy" look about them, and the *mallees* assured me that they were always replacing these old trees by young ones raised by budding To grow the orange to perfection in Bengal, the danger to be guarded against is too much tenacity in the soil round the roots. The soil in Bengal is a heavy black, clayey loam, and this must be rendered friable by lime, sand, and cowdung well decayed. A little leaf mould occasionally would not be amiss. There is no fruit that will yield so well, with so little care and attention as the orange; and there is scarcely a fruit I know that is more wholesome. It should be widely cultivated; and if I can help you to foster a taste for orange cultivation, I shall be most happy to give any information that lies in my power.

AN OLD "MALLEE"

October 8, 1885.

II.

TO THE EDITOR.

SIR,—I am much obliged for your note on orange cultivation. Would you be so kind as to let me know why the orange should be budded on to the common lime or lemon, rather than raised from seed or cuttings of orange trees? Young orange seedlings are procurable in this district. Would it be best to use these seedlings or by budding?

Would you be so good as to quote some book where I can find instructions about budding, which would seem to entail some specific knowledge and practice?

Your figures are not quite clear to me. You say 5 to 8 acres would be sufficient land to plant up to promise a return of Rs. 6,000 per annum But 100 trees to the acre (*i. e.*, trees planted 20 × 20), yielding 350 oranges per tree, would produce 1,750 score. Selling these at 4 annas per score = Rs. 400 per acre gross return. Putting away half for loss, bad seasons, superintendence, up-keep and expenses, we have a nett return of Rs. 200 per acre. Consequently we should plant up 30 acres for a return of Rs. 6,000, and it would be more prudent to take up 50 acres, and plant out 5,000 trees.

T.

NOTE.—We publish to-day a letter from a correspondent, who has had much experience in orange cultivation, which furnishes nearly all the information our correspondent "T" wants, especially as an answer to the first question. As to the second query, we should recommend him to procure the seedlings now, and use them for budding good varieties upon in February next Firminger's "Manual of Gardening for India (3rd edition) is the best book we know of. We fear we were a little out of our calculations; the information was furnished to us by a correspondent. But having enquired personally into the rates obtaining in the Calcutta markets, we are told that three qualities of fruits are sold The best fetches from 10 to 12 annas, the next from 6 to 8 annas, and the rest from 3 to 5 annas per score. This would give an average of nearly 8 annas per score. Therefore one acre of land planted with 100 trees yielding 1,750 score, at 8 annas per score, would realize Rs 875 per acre, or Rs. 7,000 from 8 acres. Allowing Rs 1,000 a year for expenses would just leave Rs 6,000 clear profit. However, to be on the safe side, 10 or even 5 acres might be planted The expense would only be in the first outlay, for we do not suppose our correspondent meditates employing an expensive staff for supervision; one mallee on Rs 1 per mensem and two coolies on Rs 5 per mensem would be quite sufficient for all practical purposes.—ED., *I. A.*

MANGO PESTS, &c

TO THE EDITOR.

SIR,—(1) Your correspondent, Mr. Hem Chunder Dutta, has been conferring a great boon on the public by contributing numerous articles on the propagation of mango and other trees I shall be obliged if he or any other gentleman will be good enough to say what the remedy is for the extermination of small white round worms, which find access to the roots of young mango plants, and so thickly cover them up that there is a separation between the roots and the earth, with the result that the young plant dies away in course of time. These larvæ are not found above the surface of the ground; but there are to be seen small ants of an ashy color over the ground and crawling on the stems of the plant. The surface of the ground about a quarter of an inch around the stem is a little loosened, and this fact, as well as the appearance of the ants moving about the stem, are signs of the existence of the small white worms under the ground. I have tried various remedies to eradicate or kill the worms without injuring the plants, but my attempts have all proved failures. In this way I have lost a large number of grafted mango plants purchased at high prices from the people who bring them in from Vizagapatam.

It is remarkable that the worms I allude to do not injure, or appear in any other kind of plants in the vicinity.

(2) I should also like to know what the best fertiliser is for the growth of mango trees. In this town, which is some four miles from the sea (71 feet above the mean level), large mango trees even do not thrive well. The high winds blowing between March and September injure the tender leaves, and the boughs wither away, commencing from the extremities until the whole tree dies In most cases, the leaves are not healthy, being perforated a few days after budding by worms, which are not visible. In some instances the decay of a tree thus injured is attributed to larvæ boring the wood. Can a remedy be suggested for the above also?

(3) Lastly, I planted, six years ago, orange trees in my garden. They are now tall, being 12 feet in height, without the corresponding bulk, but do not bear nor flower Your valuable opinion is solicited about the improvement of this tree also.

A. GURUMURTY,
Head Clerk, Collector's Office,
Ganjam District.

Chatrapore, September, 30, 1885.

NOTE.—(1.) The following emulsion has been found an excellent insecticide:—Take one quart of soft soap to one gallon of boiling water. Add one gallon of kerosine oil to every twelve gallons of soap solution, and make an emulsion by violent stirring of the mixture. Syringe the trees with this, or apply with a painter's brush over the branches

(2.) We should recommend wood ashes, bone dust or a liquid manure, composed of fresh horse-litter and wood ashes. These have been found excellent fertilizers

(3.) Perhaps the orange trees have been raised *from seed*? If so, there is very little chance of their fruiting for the next 2 or 3 years. A judicious root and head pruning in January, with an application of a compost, consisting of well-decayed night soil, cowdung, common black "tank" soil, and slaked lime (equal quantities of the first three, and a fourth part of the last named) might have a good effect. We should ourselves certainly try the remedy.—ED., *I. A.*

Editorial Notes.

WE are glad to learn that Mr. M Finucane, C.S., Director of Agriculture, Bengal, has proceeded on a tour to inspect the state of agriculture in several districts in the mofussil.

⁂

THE net amount of Indian sea and land customs revenue, exclusive of the salt revenue, for the first five months of the current official year, amounted to Rs 45,20,000, against Rs. 37,37,000 during the corresponding period of last year.

⁂

WE have received a mass of correspondence from the Revenue and Agricultural Department of the Government of India, regarding the effects of soil and cultivation on the color of wheat The subject is an important one, and we hope to review it in detail next week

⁂

A RANGOON paper says that the quantity of custard-apples imported into Rangoon from *Prome* is almost incredible, though strangely enough the consignees of the fruit are only three Burmese women It is evident that the fruit finds ready sale, from the fact that the importations are daily all cleared by 10 A M from the railway goods shed.

⁂

THE quantity of tea exported from China and Japan to Great Britain, from the commencement of the season to the 11th September, was 102,448,569lbs., as compared with 91,112,906lbs exported in the corresponding period of last year. The exports to the United States and Canada during the same period amounted to 39,414,271lbs. as against 41,571,361lbs.

⁂

IF what the *Farmers' Review* says about the sun-flower is true—and we have no reason to doubt the statement—it is really a very useful plant; and instead of being regarded as a weed, as it has hitherto been in India, it ought to take a prominent place among the cattle-feeding staples of the country. We recommend a perusal of the extract which will be found among our selections.

Dr. E. Bonavia, of Etawah, has long been known as a prolific writer on agri-horticultural subjects in India. He has contributed some able papers to our columns, and from time to time he has addressed practical letters to the *Pioneer*, the latest of which contains an account of a particularly fine variety of Cos Lettuce, with hints upon how it may be grown to the best advantage. The letter itself will be found among our selections.

⁂

It appears that the supply of salt from the Sambhur Lake was very seriously interfered with last year by floods in the hill streams, which poured such large quantities of fresh water into the lake that manufacture was stopped. The total outturn for the year 1884-85 was only 376,095 maunds, as compared with 3,614,671 maunds in 1882, and 4,3[illegible]7 in 1883. In consequence of the failure of supply, the minimum selling price of Sambhur salt, which had been reduced from 4½ to 2½ annas per maund, was raised to 8 annas at the end of June, 1884, which led to large quantities of salt being imported from Baragara, in the Bombay Presidency, from Calcutta, and from the Punjab mines.

⁂

We understand that a Wisconsin farmer who has given ensilage a five-years' test, gives the conclusion he has reached, thus: "To get the best result is to have your corn just ripe, cut and haul when dry and no dew on it, run it through the cutter and cut it fine, and give it time to heat a little as you cut, so it will pack better as the pressure increases; and it will also keep a great deal better when open for use. I have used one inch boards for covering laid double, so that no cracks came opposite, and about 600 pounds of stone for pressure to the square yard of surface, and I will say to any man that likes to have good feed for his stock that corn put into a good silo, the way I have described, will come out nice and sweet and good enough to feed to the highest-priced Short-horn, the noble Hereford, the comely black and white or the fine-bred Jerseys."

⁂

A contemporary observes that the cultivation of potatoes on the Neilgherries has long been a source of profitable enterprise, and as the natives are gradually learning to appreciate the tuber, it is satisfactory to learn that there are hundreds of square miles of arable land, which the hill tribes cannot profitably cultivate with their ordinary grains, but which, put under this vegetable, as the demand increases, would maintain their owners in comfort. The best elevation for the cultivation of the potatoe is above 6,000 feet, though experiments in the extreme north and south of the hills at 3,000 and 4,000 feet have not been quite failures. The extent of land under cultivation is estimated at 1,000 acres, including large areas of semi-drained swamps within the town of Ootacamund. Two crops are raised annually—one sown in February and lifted in July, the other sown in August and lifted in December.

⁂

They seem to be doing a good business in the production and sale of petroleum in the Caucasus. The *Génie Civil* tells us that there are about 400 wells in the vicinity of Baku, but only about half of them are at present being worked. The gross total of the petroleum extracted during the last three years is as follows:—800,000 tons in 1882, 1,000,000 tons in 1883, and 1,200,000 tons last year. Nearly the whole of this is converted into lamp oil at Baku itself, about a pound of good oil being obtained for three pounds of petroleum. There are 150 petroleum refineries at Tchorny Gorod (the Black Town) near Baku. In the course of last year, 200,000 tons of lamp oil, 120,000 tons of second-quality oil, and 500 tons of residuum were exported; these figures showing a slight increase over those for 1883 and 1882. The exports were distributed in about even proportions over the principal countries of Western Europe.

⁂

General Sir Lewis Pelly, writing recently to the *British Trade Journal* on the pearl trade of the Persian Gulf, says:—

"The pearl trade of the Gulf has been famous from the earliest historic period; and the pearl banks of the islands of Bahrein, and of the small maritime chieftains known as Dobai, Shargeh, Amulgawaine, and Rasulkhyma, on the Arab shore-line of the Gulf, are still the richest pearl-fishing grounds in the world; and yet, perhaps, the finest pearls still swirl about on the sands at the bottom of the Gulf waters. The law seems to be that the deeper the water the finer the pearl or the oyster, and the deeper water along the banks has never yet been fished. The Arabs pursue their fishery by diving from small craft, which during the pearl season may be seen anchored by thousands along the banks. Seven fathoms is the maximum depth of their diving, while their ordinary fisheries are pursued in from four to five fathoms of water. Now, as the water deepens very slowly off the Arab coast, and as this shoal water over the banks extends some hundreds of miles—from the reefs of Bahrein and El Khatiff to Cape Mussendoom—it seems probable that, were the deeper water along these banks to be exploited by steamers fitted with regular diving apparatus, miraculous draughts of pearls might still be obtained.

⁂

One of the most curious and useful results of the application of science to manufacturing processes, was discussed at a recent meeting of the Iron and Steel Institute at Glasgow, when Mr. Jones, of the Langloan Iron Works, read a paper on the present position and prospects of processes for the recovery of tar and ammonia from blast furnaces. If anything would seem to be more hopeless than another, it would be the effort to recover any valuable products from the gases produced by our blast furnaces, yet at the Gartsherrie Iron Works, the tar and ammonia are being recovered from the gases of eight furnaces, and thirty tons of sulphate of ammonia are thus recovered every week. This prevention of waste, or recovery of valuable products that we have hitherto thrown away, is one of the most valuable services that modern science can perform in cheapening production. It is unfortunate that hitherto, no satisfactory means have been found of fixing and saving the valuable part of the sewage of great towns, but the escaping gases of a blast furnace would seem to be less likely to yield useful products than the water of a drain.

⁂

The following circular order issued by the Board of Revenue, on the subject of *tuccavi* advances to the cultivator, will be read with a good deal of pleasure, by every one who is interested in the relief of the people:—

> The Board have been desired by Government to point out that the Agriculturists Loans Act, No. XII of 1884, is not intended to supersede altogether the ordinary machinery of loans from mahajuns, under which agricultural operations are carried on in this country. Its object is to enable the Government to step in, and assist the more needy cultivators with loans on those occasions of unusual pressure, when the local mahajuns are unwilling to run extraordinary risks. In granting loans, therefore, under the Act, some discretion should be exercised by district officers; preference should be given to cultivators of the poorer classes, and an attempt should be made to distinguish these from persons whose credit is good enough to enable them to obtain loans on reasonable terms from the local money-lenders.

This is precisely the order that was wanted, and if our district officers will but loyally carry it out, immense relief will be given to the people without any very serious loss accruing to the State.

⁂

We learn that Sir J. B. Lawes has concluded his report on the ensilage experiments at Rothamsted. "Upon the whole," he writes, "the analytical results clearly show that the milk of the mangel-fed cows throughout contained higher amounts of both total solids and butter fat than that of the silage-fed cows. Yet, quite consistently with the observation of others on the same points, the milk of our silage-fed cows was judged, both by colour and by taste, to be richer than that of the mangel-fed cows. The milk of the silage-fed cows possessed a slight, but not at all disagreeable, flavour, which may be described as hayey, and which could readily be detected by some, but not by others. The butter from the milk of the silage-fed cows was also much yellower than that from the milk of the mangel-fed cows, but there was no perceptible distinction between the two as to taste." On this subject, an interesting letter will be found among our selections from the pen of Mr. Thos. Easdale, of Northallerton.

THE following summary of the Board of Trade returns for August 1885 is taken from one of our English exchanges :—

The Board of Trade returns for August and eight months ended 31st August have just been issued, and in common with those of the majority of the preceding months of the year show a decrease in all branches of trade. The value of goods imported during the month amounted to £28,956,976, against £29,610,739 in 1884, and £36,224,986 in 1883, being 2·2 per cent less than in 1884, and 20·6 per cent less than in 1883 For the eight months the total is £253,207,443, against £262,753,496 in 1884, and £287,105,694 in 1883, a decrease of 3·6 per cent. and 11·8 per cent respectively. With regard to the import trade of the month as compared with that of August 1884, animals, living (for food), have declined from £1,179,690 to £991,213 or 16·0 per cent, principally in oxen from Denmark and the United States, and sheep from Denmark, Germany, and Canada. The imports of wheat have declined from 5,706,594 cwt. to 5,232,150 cwt. ; of wheat flour from 1,147,134 cwt. to 775,841 cwt. ; and of oats from 1,460,865 cwt. to 1,204,687 cwt. ; but those of barley have increased from 531,136 cwt. to 716,675 cwt. ; of beans from 303,642 cwt. to 315,506 cwt. ; and of Indian corn from 2,085,243 cwt. to 2,201,014 cwt.—the total value of corn and meal amounting to £3,752,185, against £4,585,537, a decrease of 18·2 per cent. Cheese is less by 69,775 cwt. and £258,167 ; lard by 20,175 cwt. and £56,002 ; rice by 101,024 cwt. and £80,167 ; and sugar, refined and unrefined, by 110,655 cwt. and £74,683.

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WE have had an opportunity of looking through the *Tea Planters' Vade Mecum.* It is a handy volume, compiled by the Editor of the *Indian Tea Gazette.* The nature and scope of the book are best explained by a brief reference to the very full synopsis of contents. The work is divided into sections, of which there are 27, under each of which is classified all matter relating to the special subject treated of. Thus, cultivation, manuring, blight, manufacture, &c., are treated of in separate "chapters," or "sections," in which is contained everything known, apparently, on each subject. There is an advantage in this form of arrangement, as it permits of ready reference to a particular matter, where all the information regarding it is to be found. *In this sense,* the book *may be termed almost* a dictionary, or encyclopœdia of tea and tea matters. As a book of general instruction and reference, it should find a place on every tea-planter's bookshelf. The work also contains some very able specialist professional articles on timber for tea boxes, and in the use and care of steam engines in tea factories, which should prove of great value to tea estate managers; while the chapter devoted to a description and review of the different kinds of tea machinery in use, ought to be of much use, as enabling the relative merits of inventions to be compared. The author has had exceptional opportunities of collating all the information extant upon the subject of tea, which must have cost him infinite labour and trouble to put together in its present shape. We regard the *Vade Mecum* as an authority on tea.

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THE Indian Salt revenue for the first five months of the current financial year shows a steady increase. It amounted during this period to Rs 2,50,73,000, against Rs. 2,42,67,000 for the corresponding period of 1884-85 ; Rs. 2,36,75,000 for 1883-84 ; Rs. 2,25,57,000 for 1882-83 ; and Rs. 2,81,61,000 for 1881-82, the year during which the higher tax was in force. The loss on the five months' operations, as compared with 1881-82, which in the first year of the reduction amounted to over Rs. 56,00,000, has this year been reduced to Rs. 30,88,000. The quantity of salt on which duty was paid in the five months of this year was 12,845,000 maunds, against 11,195,000 maunds in 1881-82, showing an increase in consumption of 1,650,000 maunds. The rate of increase has been as follows :—1882-83 over 1881-82 (first five months), 431,000 maunds ; 1883-84 over 1882-83, 626,000 maunds ; 1884-85 over 1883-84, 350,000 maunds ; and 1885-86 over 1884-85, 243,000. It is therefore evident that some years must still elapse before the salt revenue at the reduced tax will reach the figure at which it stood before the reduction. All the provinces share in the increase this year, as compared with last year, except Bengal and British Burmah. Bengal shows a falling-off during this period of Rs. 7,30,000, and British Burmah Rs. 36,000. The Bombay Presidency shows the largest increase, *viz.*, Rs. 10,92,000, and Northern India comes next with Rs. 4,12,000, Madras Rs. 49,000, and Sind Rs. 20,000.

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THE *Civil and Military Gazette* notices the annual report of the Agri-Horticultural Gardens, Lahore, in the following terms :—

Under Mr. Hein, the new superintendent, "the gardens have greatly improved in every way, and many changes for the better have been taken in hand." A plot of land to the south of the cricket ground which, as the report says, presented "an unsightly appearance," has been levelled, and during the past nine months planted with orange trees. Elsewhere, overcrowded vegetation has been cut away; English rose cuttings have been planted out by the hundred ; and the appearance of the gardens in spring is ample proof of the incessant care devoted to them. But it is to more practical matter that the report mainly refers. A number of experiments have been tried with plants and seeds. Most of the attempts at acclimatization failed. In May of the year 1884, twenty varieties of sugar-cane were received from Singapore. The case had been two months in transit ; and, eventually, all the cuttings died. Seeds of the *cryptomeria japonica* from Bangalore failed to germinate ; and some Italian turnip seeds germinated so luxuriantly, that the plant forgot to grow turnips below ground, and was discarded. With mahogany seed the Superintendent had better luck. Nearly one hundred young and healthy plants have been reared. Experiments were also made in Khaki, Nankin, and Georgia Sea Island cotton. The second variety, though sown in poor soil, produced well. From one seer of seed were obtained 4¾ seers of clean selected cotton, and fifteen seers of good seed. Some one, attracted by the beauty and gloss of the staple, stole a quantity of the Georgia Sea Island cotton, and sadly diminished the out-turn of the crop.

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WE have not seen the report, but our contemporary [illegible]

Ensilage experiments were, without exception, [illegible]. One pit, filled with Indian corn, smelt so fearfully o[illegible] opened, that a "gentleman whose house was situated two hundred yards off complained about it." The contents of another pit, filled with turnip tops, *bhoosa* and Indian corn mixed, were unanimously rejected by the garden bullocks. The test in this case was not a fair one ; as the bullocks are well fed beasts, and as disinclined to eat "strange meats," as is the English servant maid to feed on "them Australian tinned things." Yet a third silo, covered for six months, returned nothing but a "mouldy mass, quite unfit for fodder."

This is very extraordinary ; but as we have no details before us, it is difficult to arrive at a correct estimate as to the cause of these failures. If the most ordinary and elementary conditions of a silo had been observed, it is scarcely likely that these results would have followed. We fancy that those who carried out these experiments must have dug pits in the ground, and filled them up in the same manner as gardeners fill up pits with leaves and refuse for leaf-mould manure. For had the silos been properly constructed, and the fodder sufficiently weighted and made air and water tight, the "gentleman whose house was situated 200 yards off" would not have had occasion to "complain" of the silo.

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IN contrast to the ensilage experiment conducted at the Lahore Agri-Horticultural Society's Gardens, we read the following account of a similar experiment at the Nagpore Farm :—"The silo was merely a rectangular pit, 16 feet long, 10 feet broad, and 6 feet deep, plastered inside with cowdung. The *jowari,* which was very much stunted, was cut green and put into the silo on the 10th and 11th of November, the whole quantity weighing 66 maunds. The stalks were not cut up, and each cartload was well rammed down before the next was put in. The supply only filled the pit to a depth of 3½ feet, when it was covered with bamboo matting, dry grass, and earth to a total depth of five feet. The weight of the earth amounted to about 260lbs. per square foot. The silo was opened after five months, and the whole of its contents, except a small portion round the edge of the pit, which had been damaged by mildew was found in excellent condition. The weight per cubic foot of the ensilage when cut out was 15½lbs., and as the *jowari* had developed a sweetness which it does not generally possess, it was eagerly eaten by both horses and cattle." This farm is at present under the superintendence of a graduate of the Madras Agricultural College.

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A CONTEMPORARY notices that the cultivation of coffee in the Madras presidency is steadily extending. In 1874 there were 17,227 plantations, exclusive of 42 in the State of Travancore. More than half the total number of plantations are in Malabar, while in Madura there are 3,458, and in the Nilgiris 501. The elevation of the plantations varies from 800 to 6,000 feet. The total area taken up for the coffee cultivation in the presidency is 110,328 acres, of which 56,247 acres are under mature plants, 8,822 acres under immature plants, while 45,259 acres are only taken up for planting, but are not yet planted out. The total yield of coffee last year was 12,241,545lbs. The average yield per acre ranged from 347lbs. in Madura to 21lbs. in Vizagapatam. The cost of cultivation per acre was highest in the Nilgiris, where it varied from Rs. 63 to Rs. 156, and lowest in South Canara, where it was Rs. 26-4-0. The Madras tea industry is also doing well. There are 84 plantations, all in the Vizagapatam, Madura, Nilgiris, and Malabar districts. These have a total area of 7,553 acres; of which little more than half is actually under cultivation. Last year the outturn reached 398,045lbs. In Travancore there are 27 plantations, occupying a cultivated area of 1,487 acres. The total outturn was 105,740lbs., of which the whole was black tea. As regards the coffee industry, it is surprising to find that Madras is making any progress at all, seeing that Ceylon has lost so much ground, but if the trade were recovering something of its old position there would be a golden future for large tracts of country in the presidency which are splendidly adapted for its cultivation.

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THE advices from Mysore are far from re-assuring, the province being we fear within measurable distance of famine, owing to the failure of the rains. It is but seven years since one-fourth of the population were swept away by the famine of 1877-78. The young Maharaja deserves every encouragement and assistance that the Supreme Government can give him, for in handing the territory back to native rule, we gave it back absolutely ruined, and with a debt of £800,000 upon its shoulders. As to exacting the enhanced tribute demanded of the Prince, it is out of the question altogether. The amount ought never to have been increased, when the result of our own direct administration of the province had proved to be so ruinous to its people. In some respects, the cultivators of Mysore appear to be more advanced than those of any other part of India, and they will not succumb readily to this new misfortune.

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THE following is a summary of the health, crops, and weather reports for the week ending 30th September 1885 :—Rain has fallen in all districts of the Madras presidency from which reports are received. Prospects are generally fair, and have greatly improved in Bellary and Anantapore. More or less rain has fallen throughout the Mysore State, and prospects are less discouraging. More rain is wanted generally, especially in the Mysore and Kolar districts. In Coorg prospects continue favourable, but more rain is required in parts for the rice crop. Good rain is reported from all districts of the Deccan and Southern Mahratta country. In Guzerat and in parts of Khandesh more rain is urgently required. *Rabi* sowings have commenced in most districts in the Deccan and in parts of Bijapore and Belgaum. Fodder is scarce in parts of Belgaum and Dharwar. In the Berars the crops are progressing favourably, but more rain is wanted in Akola. In the Nizam's Territories the rainfall of the week under report has been beneficial to the crops, and prospects are favourable. More rain is much wanted in most States in the Central India and Rajpootana Agencies.

The recent rain has much improved prospects in the Central Provinces, but more is still required, especially in Nimar. Preparations for the rabi crop have commenced. In the Punjab no rain fell during the past week, but prospects are on the whole good. Rabi operations have commenced in parts. Rain has fallen throughout the North-Western Provinces and Oudh but more is needed in places. *Kharif* crops have benefited by the rain, and harvest operations have begun in a few places. Prospects are on the whole good. In Bengal rain has again been general. Prospects of crops are good, except in the flooded tracts in the Burdwan and presidency divisions, in Behar, and also on the sea-coast of Orissa. *Bhadoi* crops, where not injured by floods, are being harvested with fair results. In Assam agricultural prospects continue favourable. Crop prospects are good in British Burmah. The public health is generally fair. Prices are high in Bengal, and are generally steady elsewhere, except in Mysore, where they are rising slightly.

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A CORRESPONDENT of the *Madras Times* brings to notice the merits of two native gentlemen, who have done a great deal in the cause of agriculture. This is what it says of one of them :—

"Mr. Sabapathy Moodelliar is a native of the Bellary district, and is well known as one *of its very foremost citizens*, as a man of education, wealth, energy, and intelligence; as a merchant and an advanced agriculturist. He has in his own hands upwards of 4,000 acres of land belonging to rayyets which he has taken, which he works with them, to which his capital has been applied. He has imported some 350 of the best pattern English ploughs; and practically *shown* their advantages: he has actually sold some 200 of these, while the others are used on his own lands. He has experimented with manures, and especially with poudrette, the whole outturn of which, I believe, he buys from more than one municipality. He it was who persistently followed out experiments in feeding cattle on prickly-pear; and to this day he *does* so feed them partially, with the best results. He has employed a number of men trained at the Saidapet farm, and if we had not had such bad seasons, would probably have very much extended his operations. So he has started steam cotton presses all over the country. In eight of these he is interested, most, if not all, started by himself; he still manages, and is the leading spirit of, them all; they have, after their success has been assured, been formed into Companies *paying good dividends*. He was one of the movers, perhaps the chief, in the Bellary Spinning and Weaving Mill, where at present spinning only is carried on, and the management of which is now in his hands with the most satisfactory results; and he has another mill at Pondicherry, where both spinning and weaving are carried on. He has a distillery at Bellary, and also a small sugar factory, and he is largely interested in extensive sugar works at Panrooty in South Arcot. Above all, he is distinctly a *a man of the people*, thoroughly trusted by them, thoroughly acquainted with their feelings and their wants."

Of the other it is written :—

"He is an hereditary landholder in Tanjore, and is a Mirasidar in the Shiyali taluka of that district. His letters and reports which have been published by the Agricultural Department show him to be a man of considerable education, though not a 'Bee Yea'; and instead of following the usual *role* of zemindars, he has gone in energetically for improvements, in the carrying-out of which he himself takes an active part. He has now close on 1 700 acres of land under his own system of cultivation, most of it with improved ploughs, which he at first got from Madras, but which he now makes on his own estates. He has started a workshop; trained artisans, whom he has taken round the best workshops in Madras; and now, he makes and repairs ploughs not only for his own use, but also for sale to adjoining landholders, amongst whom, I am glad to say, his spirited example is gradually having its natural effect. He also employs some of the trained men from Saidapet; he experimented (and continues doing so) with various kinds of manures; he *has introduced on his lands a better class of cattle; has shown an example of great* value by housing them properly, *feeding them properly*, and carefully looking after, and collecting in the best way their manure. He has started a machine for crushing oil-cake for them, and is always ready to give a fair trial to anything that gives real promise of being successful and economical; while his experiments are carried out in the true and proper spirit, as may be seen from this short extract from a late report, at the end of which he says, 'I beg to state that these cannot be taken as my conclusive opinions, *since I am always changing them while my understanding of the matter increases*.'"

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THE following is a summary of Messrs. Wm. Jas. & Hy. Thompson's fortnightly circular of Indian tea, dated London, 10th September, 1885 :—"Upwards of [illegible] packages have been brought to auction during the fortnight, including 3,600 packages from Ceylon, and 1,500 packages of repriuted tea. A considerable portion of this has been tea of really fine character from Assam and Darjeeling, which from the lowest to the highest grade has met with keen competition, and has realized very satisfactory prices. Closing rates for fine descriptions are not quite up to the highest point, notably for Pekoes and Broken Pekoes, between 1s. 9d. and 2s. 3d. per lb. Teas with good make but indifferent liquor—in which category most of the Cachar, Sylhet, and Chittagong teas recently received are unfortunately included—become less easy to sell as supplies increase, and the weakness in quotations for common to medium Pekoes foreshadows a low range of price for these kinds later on. Leafy and broken sorts under 11d. per lb., however, are just at present an exception, as they are selling at stiff rates, the retailers having apparently come to an end of their stocks of cheap Souchongs and Brokens. Considering the cheapness of China tea, between 8d. and 10d. per lb., it is hardly safe to reckon upon these prices being maintained; to some extent, however, they reflect the opinion of consumers as to the respective merits of China and Indian tea; for the relative value of the different growths depends almost entirely upon the balance of opinion among the mass of buyers throughout the country, by which the London dealers are guided in their operations. An illustration of this may be seen in the price of Ceylon teas, which continue to grow in favour, and to some seem dear in comparison with Indian: it is clear, however, that consumers who make the market think otherwise. We are unable to trace any change in the direction of a special demand for any particular *type* of tea; the highest prices, as we stated in our last circular, have been realized for the fully fermented, extra strong kind, and as successful instances of this type we must quote the teas just received from Amgoorie, Borelli, Jhanzie, Kellyden, Teok, and the Assam Company (not yet sold); but the prices obtained for the Cinnamara, Meleng, Mijicu Jan, Salonah, Scottish Assam, &c., and for the Ting Ling, Singbulli and Murmah marks among Darjeelings, show the strength of the demand for lighter teas with more flavour or pungency. The deliveries during August were again light, and from the figures overleaf, it will be seen that for the first three months of the season there is a serious falling off both in China and Indian. Taking the deliveries, however, from the 1st January—which includes the four months before and after the Budget—consumption of Indian and Ceylon has been 45,683,000lb., as compared with 41,190,000lb. during the corresponding eight months of 1884; and the delivery of China, &c., 100,880,000lb., against 102,100,000lb. At the Calcutta sales of the 27th of August, about 12,000 packages were sold at previous prices, the average being 9¼ annas; and on the 3rd of September, about 14,000 packages were sold at 10 annas average, the market being quoted irregular, but generally ½d. to 1d. higher, a large proportion being Assam tea of good quality. The averages of the corresponding sales last season were 9·9 and 9·4 respectively. To-day 16,000 packages were offered."

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Mr. D. B. Allen, of the Bengal Agricultural Department, has addressed the following letter to the *Englishman*, on the subject of bones as a manure:—

Bones were first used as a manure in England about seventy years ago. At first they were ground, but after the method of dissolving them in sulphuric acid was discovered, the custom of using bone super-phosphate was generally adopted. It will probably be many years before bone super is commonly used in India, but it may be possible to treat bones in a cheap and simple way, which has more chance of becoming popular in this country. Putting aside caste prejudice, which is not an insuperable obstacle (for where labour is cheap, low caste men can always be employed to do the necessary handling), I come to the great objection that has been often urged, *viz*., the labour and expense of grinding bones sufficiently fine to spread evenly over the soil. This may be avoided by the process of fermentation. The value of fermented bones is recognised in England, and some farmers prefer it to super (*vide* the article on Agriculture in the *Encyclopædia Britannica*, ninth edition). This preference is not judicious; but experiments have proved conclusively that fermented bones give better immediate results than those obtained by applying bones raw, though the lasting effects of the latter continue for a greater number of years.

The process of fermenting bones is exceedingly simple. The bones, when collected, should be piled in a heap and mixed with half their weight of earth. The mass should be well wetted with urine or the liquid oozing from a dung heap, and then covered with a coating of clay about two inches in thickness. Strong fermentation will take place, and in three or four months the bone manure will be ready for use. It will be found especially valuable on light soils: and a good dressing of a ton to an acre will improve the crops for several years. The special value of bones is due to the phosphates they contain, and the experiment I advocate is so cheap and simple, that any one can prove for himself whether this system of manuring is advantageous or the reverse.

It must be remembered that the effect of bones, even when fermented, is not immediately apparent. As a rule the benefit of this manure will be seen better on the second crop sown after the manure was applied. Nor do I pretend that bones will give as valuable results as a general manure like cowdung. The value of cowdung is well-known to cultivators, and all that is not required for fuel is carefully stored and applied; but as cultivation increases, and the supply of cowdung diminishes, the necessity for some cheap substitute becomes more and more apparent. Bones alone will not supply this want, but bones and saltpetre will, I believe, except on lands naturally rich in soluble salts, afford the best substitute that can be got in India. Saltpetre alone will on some soils give marvellous crops, but this very fact tends in the long run to further exhaustion of the soil, unless other manures like bones are occasionally applied in order to maintain its normal fertility.

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In the *Proceedings* of the Agri-Horticultural Society of India, 23rd September 1885, we find the following communication from Mr. J. A. Middleton, of Tinkong, regarding his experiments with economic plants at Tipling:—

" *Vanilla.*—I think I told you that I had planted it in virgin jungle with only the undergrowth cut down. It came on splendidly, but I regret to say that the squirrels took a liking to it and eat off the shoots as they came out. I have removed it to a more open space and have planted artificial shade over it, and I am glad to say it is now doing very well. Of course this transplanting has checked growth considerably, and will, I fear, cause delay in blossoming and fruiting, but I have little fear for it now.

" *Ceara Rubber.*—Last lot has germinated fairly well; after it is germinated it seems to have only one enemy, namely, the mole-cricket. This fellow destroys them when they are 3 to 4 inches high. I had 40 plants destroyed in one night. The only tree that came to any size here (Tinkong) out of the very first lot of seed you sent me, has begun to flower. I regret to tell you, however, that during a thunderstorm some two nights ago the flowering branch was broken off. This branch I have cut in pieces and planted to see if they will grow. In March one of the trees planted at Tipling was blown down in a gale. I had it cut in pieces and planted at once, and I am glad to say that all the cuttings are doing well. I should now be obliged by your giving me some information as to when, where, and how the trees ought to be taped.

" *Divi Divi.*—As I told you some time ago the tree grows very freely here. Nearly every seed you sent me has germinated. The few trees I have here have not grown much in length lately, but have thickened about the roots, and have spread out on top. They seem to like the sun, as all are turned towards the south and south-west. Two are especially noticeable in that way, being spread out like trained plum trees facing south-west, not a leaf on the other sides. There is no shade anywhere near them, so I cannot account for this way of growing.

" *Rhea.*—I regret having forgotten to watch this plant at seeding time (end of April and May), as I wished to send you seed. I was busy with a lot of new machinery and building at the time, and the Bungalow garden was rather neglected. I shall be very glad to send you a lot of cuttings if you wish them, and shall try and remember seed next year.

" *Vegetable Seeds.*—When distributing the seeds I should like you to send all " *Buists* "[*] if possible. I find that they do best in Assam. For eleven years I have never had a failure with them, whereas even the best English seeds have never been a great success either with self or neighbours.

" *Neem.*—This tree requires great care. I have been able to save three trees only, and would be glad of a few more seeds if you can spare them.

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[*] *American grown seeds from R. Buist, Jr., Philadelphia.*

"I note your remark that the Bengal Government are desirous of utilising the members of our Society for experimental purposes, as I shall be most happy to give every assistance in my power, and shall give any seeds or plants sent me my best care."

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A short time ago we noticed the offer made by Mr. Nichols, C.S., to supply free of charge seeds of the "Katang" Bamboo (*Bambusa Arundinacea.*) In the *Proceedings* noted above we find the following letter from Mr. Nichols to the Society, and their comments on the subject :—

"I trust that a packet of Katang Bamboo seed will be despatched to-day to your address ; you will, I believe, have nothing to pay. I shall be more than recompensed by your success. I venture to advise sowing in shallow pans or in seed beds in shelter. Transplant to a nursery bed when the seedlings are about two inches high. Again transplant when about seven inches high, and keep till finally located in a place where they can be frequently watered. The Katang likes a rather sandy alluvial soil, though it will do well on 'regur' or black cotton soil.

"So far as I can see, there will probably be no chance of getting more seed for some forty years. This variety is believed to have a life period of about 55 years. It often attains the height of sixty feet under favourable circumstances."

In 1836 Captain Sleeman recorded in this Society's Journal (*Transactions*, Vol. III) the flowering and death of all Bamboos in Dehra Doon, and states that it is a characteristic of the Bamboo that all the produce of the same seed will run to seed and die in the same season without reference to the season in which they may have been transplanted from original stock. Dr. Brandis seems to confirm this in his *Forest Flora*, and says isolated clumps may be met occassionally, " but as a rule all clumps in one district come into flower simultaneously, a few clumps flowering in the previous and some in the succeeding years." So it is probable that there will be a wide-spread flowering next season.*

We also find the following regarding the *Erythroxylon Coca*, in the same *Proceedings* :—

Since the very valuable properties of this plant have been recognised, the utmost attention has been paid to its propagation at the Society's Garden, where a large plant some four feet high has long been established. Plants are now being distributed to members in selected districts for trial and report, *viz.*, Darjeeling, the Terai, Cachar, Pubna, Tirhoot, Mussoorie, the Neilgherries, and Assam. In Bengal the plant seems to flourish without any special care or shelter, and seeds very freely.

GENERAL WILKINSON ON ENSILAGE.

II.

We now come to the practical results of General Wilkinson's various experiments. The silo, filled on the quick-loading system on 18th September 1884, was opened about the end of the year, *i.e.*, barely three months after filling. We regard this period as scarcely sufficient to give anything like satisfactory results, nevertheless, in the present instance, the General assures us that the forage was "an excellent sample of ordinary wet sour silage, uniformly good throughout." The waste was limited in this case to two inches of grass immediately under the mats, though in places round the sides, especially near the door, the forage in contact with the walls was slightly mouldy ; but exposure to the sun and air rendered the whole of this fit for use. An inch of water was found at the bottom of the silo, but this, it is said, had in no way injured the forage in contact with the floor of the building. Two other silos, one on the quick-loading, and the other on the slow-loading system, were opened in March last. We were ourselves present at the opening of these, and published a few short notes then placed at our disposal. These, however, gave very little information. From the report before us, it appears that "every blade of grass in both silos was in excellent condition, except that, as usual, the grass immediately under the mats had perished to a depth of not more than an average of 2 inches." It is further stated that, to decide positively whether the slow-loading system caused any destruction of fibre during the process of fermentation, thus causing loss of bulk in forage, one superficial yard was marked on the top of each silo, and the whole of the silage below it was cut out as carefully as possible down to the very bottom to ascertain whether there was any marked difference in the weight of the two trusses thus obtained. The result was that the truss cut from the quick-loading silo weighed 1,004lbs. while that from the slow-loading, 874lbs. This difference in weight was, however, due to the fact of the latter silo having been built *over* a quick-filled one, which received the drainage from the slow-filled one. To arrive at an accurate estimate, a similar truss was cut from the quick-filled silo *under* the slow-filled one which weighed 1,138 lbs. Adding this to the 874 lbs. and dividing by 2, will give the average of 1,006 lbs. Thus it will be seen that slow-loading does not cause any diminution in the actual substance of the silage, while making it pack closer.

Referring to the space occupied by silage, it was found that the two slow-loading silos showed an average of 36½ inches of depth while the quick-loading was 46 inches with the same quantity of grass, thus showing 9½ inches more space in every 36½ inches occupied by the slow-loading method. General Wilkinson rightly says that "this is a most important fact, as the cost of masonry silos is the one argument against their universal adoption." The calculation made by the General as to the proportion of silage obtained from green grass is important. There were three silos, 10′ by 10′ by 10′, each filled with 192½ maunds of grass. The average depth in the two slow-loading silos, as before said, was 36½ inches ; and one square yard of this having been cut out down to the bottom, would give one-eleventh of the entire contents ; and as each silo received 192½ maunds, or 15,400 lbs. [one maunds=80 lbs.], one-eleventh of this weighed 1,400 lbs. of *green grass.* When converted into silage, it weighed 1,004 lbs., having lost 396 lbs., or about 28 per cent in weight in both the quick and slow methods. General Wilkinson observes that there is every reason to believe that the whole of this apparent loss is due to the evaporation of excessive moisture ; and that if the grass was cut on a dry day free from rain water. the loss in weight would be very small, probably less than 10 per cent. What he says about hay. occupying *weight for weight* six times as much space as silage, and about its containing *weight for weight* three times as much solid feeding matter, we remember to have read *some time* back in one of our English or American exchanges. It is further stated by the General that to those who have to purchase *wet* green grass by weight for their silos, it may be useful to know that, to estimate the amount of matured and sound silage, they must deduct about 28 per cent for dryage and 2 per cent for loss by rot and mould, or 30 per cent in all. But if only wet with dew, then 12 per cent. The following remark is important :—

" Silage weighs from 35 to 40 lbs. to the cubic foot, and one cubic foot is a full allowance for a large Hansi or English cow. Exactly one-half of this amount is sufficient for one of the very small village country cows, or for an ordinary agricultural bullock. So that a masonry silo 10′ × 10′ × 10′ containing, say, 6 feet of good sound silage, will feed an English cow for 10 × 10=100 × 6=600 days, or a *pair* of country bullocks for the same period."

In England, it is said, well made silage weighs 50 lbs. to the cubic foot ; but we suppose an extraordinary pressure would be required to bring this about. General Wilkinson's estimate seems a very fair one. We should like every cultivator to know that a silo 10′ × 10′ × 10′ filled with 6 feet of silage, will feed a pair of bullocks for nearly two years. It would rather astonish the untutored ryot to be told that he could preserve his cattle fodder in a green state for a day of scarcity without any great trouble, risk or cost, sufficient to last him for his pair of bullocks for nearly two years ! It is only by putting the matter before him in a plain, unvarnished, practical way, that our officers of the Agricultural Department can hope to effect *any* good among the cultivating classes.

Turning now to the nourishing and fattening powers of silage, we find that the figures quoted by us in April last in connection with these experiments were not quite as full as we have them in the report under review. To enable our readers to arrive at a fair conclusion, we quote this portion of General Wilkinson's report *in extenso* :—

All published statistics show, and my recent experiments fully confirm the fact, that silage is more easily digested, more nourish-

and fattening, than the green grass from which it is made. The accompanying table shows one of the advantages of silage :—

Statement of feeding and weights of four Ordnance Bullocks fed on silage and four fed on ordinary rations from 29th December 1884 to 14th February 1885.

Four bullocks fed on ordinary rations.		29th December 1884.	30th January 1885.	7th February 1885.	14th February 1885.	Increase.	Decrease.
	Paddy straw, dry grass rate.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Ordinary rations.	at 25lb daily ..	1,024	1,020	1,021	1,020	..	4
	at ditto ..	1,096	1,095	1,098	1,108	12	..
	at ditto ..	947	1,000	970	974	27	..
	at ditto ..	1,069	1,[illegible]	1,096	1,164	85	..
	Total ..	..	..	..	..	74	4

Four bullocks fed on silage.		29th December 1884.	3[illegible]th January 1885.	7th February 1885.	14th February 1885.	Increase.	Decrease.
	Green grass rate.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Silage ..	at 35lb daily ..	1,188	1,185	1,190	1,194	6	..
	at ditto ..	984	1,026	1,030	1,030	46	..
	at ditto ..	1,108	1,187	1,140	1,140	32	..
	at ditto ..	1,070	1,108	1,[illegible]	1,108	35	..
	Total ..	..	..	..	..	1.2	..

N. B.—Paddy straw is so bulky for its weight that 25lbs. of it is considered by Government to be equal to 35lbs. of any green forage.

Six cows were experimented on—two of them large Hansi animals, letter A and B, and four small country cows numbered from 1 to 4—

Six cows, all fed on green grass up to 1st November 1884.	1st November 1884. weight.	Weight on 1st December 1884.		
		Fed on grass	Fed on silage.	
	lbs.	lbs.	lbs.	
Letter A. Hansi cow ..	712	816	..	
No 1 country cow ..	411	408	..	Lost 3lbs in weight.
„ 4 ditto ..	344	367	..	
Total ..	1,467	1,591	..	Total gain 124lbs.
Total gain on green grass ..	..	142	..	
The same cows fed on silage.	lbs.	lbs.	lbs.	
Letter B, Hansi cow ..	528	..	642	
No. 2, country cow ..	414	..	430	
„ 3 ditto ..	403	..	483	
Total ..	1,[illegible]45	..	1,555	
Total grain on silage ..	..	..	210	

Letter A cow had been recently purchased in poor condition, so that it was still putting on flesh rapidly when these experiments begun, or they would have been still more favourable to silage.

The silage used in all of these experiments was made on the *quick loading system*. The grass from which it was made was the common "ulu" of Bengal (*Imperata arundinacea*)—one of the poorest forage grasses in India.

We direct particular attention to the opening paragraph of the foregoing quotations. It will also be seen from the figures that the advantage was all on the side of silage. We regard these results as conclusive ; and it is difficult to understand how any one could, after studying these results, come to any other conclusion than that silage was superior to fodder in a green state. It is true that in the feeding experiments with the cows, the General has omitted to give us the respective weight of silage and green grass upon which they were fed ; but it may be taken for granted that they received fodder of both kinds in the same proportion, or based on the same calculation, as that given to the bullocks.

General Wilkinson observes that very recent experiments with silage made from the same grass on the slow-loading system, have not given good results, the animals losing weight when fed on it. He therefore does not recommend this system for general use. This is an important point, and should be noted carefully by those engaged in ensilaging fodder. We ourselves fail, however, to account for this result, as the silage was of the sour kind. But practical testimony ought to go a long way towards establishing a fact.

We find also that three Government bullocks in poor condition and at constant work, when fed on silage for one month, showed a total increase of 132lbs. Similarly, six other bullocks, all in the sick lines suffering from chafes, &c., were fed on half silage and half paddy straw for one month, and showed a total increase of 560lbs. or an average of 96lbs. The silage in both these instances was made from the common *ulu* grass on the quick-loading system.

Looking at the experiments in the quality of milk, we find the same advantage on the side of silage. The milk was first tested with the cream, *i.e.*, fresh from the cow, and afterwards in its skimmed state, 14 hours after. The General says : "All cows (at any rate in India) yield less and less milk, and their milk gets poorer as their calves get older. Native cows generally cease to give any milk about six months after the birth of a calf." A different opinion has, however, been expressed by a gentleman who has graduated at the Cirencester College ; but having had some experience in India ourselves in dairy farming, we are in a position to corroborate generally the opinion expressed by General Wilkinson. The milk is "thin" and poor for a week or so after the birth of a calf, but improves steadily for about three months, after which it begins to get "thin" and poor, and deficient in quantity during the next three months, after which it ceases as a rule. There are exceptions of course, and we have known Hansi cows in the Harriana district to give *good* milk for 8 and 10 months. This was noticed by us in the case of cows kept at the Hissar cattle farm ; but they were exceptionally fed and cared for, which is not the case with the great majority of cows in India.

We take one more long extract from the report under review, as follows :—

> The effect of this forage on the quality of the milk was, however, very marked, the use of silage almost invariably improved the quality of the milk to a perceptible degree, and the lactometer showed that the increase in cream was often very great.
>
> The following table records the result of observations extending over six periods of 15 days each, commencing on the 1st November 1884. Six cows were experimented on, and the first six lines in the table show the result when these were fed upon green grass, chiefly *ulu*. The silage was made from the same sort of grass on the quick loading system
>
> It will be seen that as time went on the "figure of merit," that is, the figure recorded from observations with the lactometer gradually sank, so long as the animals were fed upon grass.
>
> The last six lines of the table show the result when these same six cows were fed on silage. It will be seen that the decrease in richness that was to be expected as time went on and the calves got older was greatly retarded, and in some cases the milk was considerably richer at the end of the experiments than it had been at the beginning :—

	Number or letter of cow.	Normal figure of merit.	Richness of milk tested at periods of 15 days.							
			First period.	Second period.	Third period.	Fourth period.	Fifth period.	Sixth period.	Re[illegible]	
Fed on grass.	Hansi cow A.	12	11	9½	Put on silage.			..	Loss 2½=5 p c	Fed on grass.
	ditto B.	8½	Silage.		6½	6	6½	..	Loss 2 =4 p c	
	Country cow 1	10	10½	6½	Silage.		..	..	Loss 3½=7 p c	
	ditto 2	9½	Silage.		8½	9	Calf died.		Loss ½=1 p c	
	ditto 3	10	Silage.		8½	7	8	..	Loss 2 =4 p c	
	ditto 4	15	11	12½	Silage.		..	..	Loss 2½=5 p c	
Fed on silage.	Hansi cow A.	12	On grass.		13	12	11	15	Gain 2 =4 p c	Fed on silage.
	ditto B.	8½	7½	7	Put on grass.			..	Loss 1½=3 p c	
	Country cow 1	10	On grass.		6	8½	6	..	Loss 4 =8 p c	
	ditto 2	9½	8½	10	On grass.				Gain ½=1 p c	
	ditto 3	10	13	11	Ditto.				Gain [illegible]	
	ditto 4	15	On grass.		14	12	12½	..	Loss 2½=[illegible]	

The General thinks that to obtain the best results, the forage should be freshly cut and wet with rain or dew. He does not advocate the addition of salt; and recommends that silage should be cut out with a big knife in the same way as a stack of hay is cut at home ; and that it is advisable to shake it out in the air, sun, or wind for a few minutes before offering it to cattle. It is to be understood, as a matter of course, that "the better the grass the better the silage," and the better the silo, the better will be the results, as there will be much less loss from rot or mould.

Reviewing the three kinds of silage, the General confidently recommends the quick-loading. He says: "It never fails, and the results of all my experiments are entirely in its favour. If made of good grass, cattle prefer it to all other forage, and thrive and improve on it in an astonishing manner." With regard to the slow-loading method, he observes:—

> "It appears in every respect exactly the same as quickly-loaded silage, except that it is more tightly compressed in the silo. The result of the feeding experiments with it, however, have been most disappointing. I therefore cannot recommend it. Further experience may show that this failure was not due to the system, but till that is proved I strongly recommend that the quick-loading system be adhered to. It has yet to be proved that sweet silage has all the fattening, nourishing, and milk producing powers of sour silage."

He is somewhat diffident about expressing a decisive opinion in respect to sweet silage, for he says:—

> "I have not sufficient experience of sweet silage to recommend it. Cows A and B have been fed on it for three weeks, and continue to give good rich milk, but the quantity is decreasing, probably because their calves are fully eight months old. The system is a troublesome one, and could never be generally adopted."

We, however, do not agree in the opinion that it could "never be generally adopted." The trouble is very little more, and we have every confidence that time will prove sweet silage to be the "silage of the future."

The following remark, regarding the grass found by him in the Fort, is important:—

> "In Bengal I think the grass recently found by me in the ditch of Fort William should be sedulously spread throughout the country. It is not only one of the best forage grasses known in the world, but it is particularly suitable for horses and cattle; it resists drought, flourishes in Bengal, and can be kept in stack for 10 or 12 years. This is just the grass that is wanted in India and particularly near sea ports and great centres, as it could be collected in stacks and kept as a grand forage reserve in case of war or famine."

The grass referred to is the *Andropogon pertusus*, which is also known under other synonyms, such as *A. punctatus, Holcus pertusus, A. annulatus, Lopeocerces pertusus.*

In conclusion, we have only to say that *one* such experiment as that conducted by General Wilkinson, proves more than all those carried out by district officials, and which we have from time to time noticed in these columns. These were—we have no hesitation in saying it—in every instance worthless; and it is a pity that the Government of India ever permitted them to be carried out. So far as we can make out, the General has left no point unnoticed. The experiment was *thorough*, and he deserves great credit for the exhaustive, painstaking, and laborious manner in which he has drawn up his report. He has done a *real* service to the country in a most important matter of agricultural economy, which should be duly acknowledged by the Government of India.

THE IMPROVEMENT OF SEED CORN.

[*Communicated.*]

Some few years since the Council of the Royal Agricultural Society, with the view of stimulating the production of improved varieties of wheat, opened a series of prizes, and although after protracted and exhaustive trials, the judges appointed by the Society were not unanimous in admitting that any of the varieties submitted in competition were distinct from sorts already in cultivation, there were two kinds selected as being far in advance of the others, and considered of such sterling value as to justify special recognition in the shape of silver medals. It was the subject of this competition that suggested to Messrs. Carter, seedsmen, of High Holborn, London, the desirability of conducting some thorough experiments, with the object of artificially classing some of the most popular varieties of wheat. An account of these experiments may perhaps prove of interest to the readers of the *Indian Agriculturist*. The autumn of 1882 saw the commencement of the process, by the sowing of the finest samples that could be obtained, with the object of having the very best blood to commence with. In the spring of 1883 some twenty or more crosses were made by one of Messrs. Carter's professional experts at their Experimental Grounds at Forest Hill, under the personal guidance of Mr. Sharman, the Manager. It may be noticed here that in the opinion of these experimentalists, natural cross fertilization of wheat, *i.e.*, the impregnation of the pistil of the wheat floret with other than the pollen produced in the same flower, is physically impossible, and the process can only be made successful by the most careful and practised expert. The grains upon which the fertilization had been effected were carefully harvested, and in the autumn of 1883, sown side by side with either parent. By this means the most thorough comparison could be made, and peculiarities discovered. In due course of time, it was observed at a very early stage of growth that in several instances the effect of hybridisation had been successful, inasmuch that the hybrid, or the child so to speak, instead of having the upright habit of growth of the female parent, would have the prostrate and peculiar drooping form of the male, and *vice versa*. In some other cases, the offspring has the smooth chaff of the male, whereas the female form has the peculiar woolly chaff well known form of some kinds of wheat.

Another noteworthy instance of the direct result of hybridisation is shown in No. 19 (which is described further on), where the female is a woolly-chaffed, short-strawed wheat and the male is a very large, bearded and tall American variety; the offspring in this case is about a foot taller than the female, the chaff is more or less smooth, and the thick-set ears bear minute awns at the apex of the chaff of each grain in the tiers which appear to greatly puzzle the birds, and is known at present by the name of the bird-proof variety.

Another remarkable result is No. 13, the female parent being the well-known early Talavera.

It is expected that the hybrid in this case will prove of inestimable value for sowing in those countries where the seed time is in spring, and where earliness is an important desideratum, inasmuch that after careful personal observation, we have been able to confirm Messrs. Carter's own experience that the hybrid ripens, and is fit to harvest fully 14 days before either parent. This peculiarity was observed in the trial of last year, and this season's results fully confirm it. The ears are much finer and the grain appears to be greatly superior to the American duluth; it is also quite a fortnight earlier than that well-known American variety, hitherto considered the earliest variety in the United States.

It is the custom, we believe, for English millers to mix a certain proportion of red wheat with imported whites with the object of giving substance to the flour, and Messrs. Carter with this fact in view have used red and white varieties of wheat in several instances as respective parents. Up to the present time the limited quantity produced in the experiments has not admitted of any of the hybrids being submitted to milling experts, but bearing in mind that only those varieties of wheats that are already known and liked by millers have generally constituted the parents, that the milling value will be great may be accepted as a foregone conclusion.

Various peculiarities are shown in the hybrids. *In one instance extreme earliness, in another immunity from damage by birds, in another firm seating of* the grain and non-liability to "thrash out" on the land during the prevalence of windy weather, a desideratum of the utmost importance to the New Zealand wheat-producer who leaves the grain until it is dead ripe, cutting off the ears almost close to the base and leaving the long straw to be worked into the land.

Another variety is remarkable for the short, thick, and firm nature of the straw. This appears to be a wheat that the heaviest torrent would fail to "*layer*," and it is specially adapted for poor or very cold wet soils.

One feature is apparent throughout the trials, and that is, the remarkable vigour and productiveness of one and all of the hybrids as compared with the parents. This is the more remarkable, as in this season's trials which we had several opportunities of inspecting, the offspring has had the middle position in the plots, the parents as we have before stated being sown on either side, and a broad path left on either side of them again for the greater convenience of observation, so that the parents had the advantage of more sun, air and light; yet, notwithstanding these manifest advantages, the hybrids are immensely more vigorous and productive.

It should be mentioned that the cultivation was alike for all, and was not by any means high; and an equal number of grains were sown in each instance throughout, so that this comparison in regard to productiveness is very reliable.

As an instance of the remarkable vigour of the hybrids, we were shown one plant in the row (No. 9) having 60 distinct ears; these are very long and well filled averaging 50 grains per ear, and the entire plant the produce of one grain showing a produce of 3,000 grains or 3,000 fold.

We have also had an opportunity of examining the ripe corn, when the distinctive features indicated by the habit and peculiarity of the plant is confirmed by the varied form and colouring of the grain.

It is upwards of 30 years since any records were made of the hybridisation of wheats in this country (England), and it was then that Mr. Sharriff succeeded in developing some important improvements in seed corn.

The following varieties have their distinctive character so fully developed, that Messrs. Carter have determined to cultivate them in larger quantities the ensuing season, with the object of placing them in the hands of the public as soon as possible:—

Hybrid No. 18.—Sown November 19, 1884.

Height of female, 4ft. 6in.
,, ,, hybrid, 5ft.
,, ,, male, 4ft. 9in.

Talevera White, crossed with Carter's Royal Prize Red.

Female, in ear, June 11.
Hybrid ,, ,, ,,
Male ,, ,, ,,

The advantages claimed for this hybrid are very broad ears partaking prominently of the character of the male parent, a very early and wonderfully quick ripener, being fully matured quite 14 days before either parent.

Hybrid No. 19.—Sown November 19, 1884.

Height of female 4ft.
,, ,, hybrid 4ft. 9in.
,, ,, male 5ft.

Carter's Fill measure, crossed with Mammoth White.

Female, in ear June 19
Hybrid ,, ,, [illegible]
Male ,, ,, 22

The female in the early stage of growth is dwarf and prostrate, while that of the hybrid is upright, after the style of the male; in its maturity it nearly approaches the height of the male parent; the ears are more bearded than those of the female and not so woolly; they are thick and closely set; the spiny beards are a great protection from birds; ripens 10 days earlier than either parent. Harvested August 22nd; considered a most distinct cross.

Hybrid No. 10.—Sown November 19, 1884.

Height of female 4ft. 6 in.
,, ,, hybrid 5feet.
,, ,, male 4ft 9in.

Square-headed White, crossed with Hunter's White.

Female in ear June 16.
Hybrid ,, ,, 22.
Male ,, ,, 16.

Although it will be observed the hybrid was six days later in flowering, the ear was dead ripe six days earlier than either parent. The straw of this hybrid is of splendid quality, and would gladden the heart of the most exacting bonnet builder, and the wheat appears specially adapted for light dry soils; one of the plants carried 40 ears, thus showing an immeasurably superior productiveness to either parent.

The male parent is very apparent in the hybrid in length of ear, but the stout bright coloured straw takes the form of the female—ears narrow, very long, and well filled, 10 tier, 5 a st grain.

ROYAL BOTANIC GARDENS, CALCUTTA.

The following resolution of the Government of Bengal contains a summary of the work done in these gardens during the year 1884-85:—The unusual mildness of the last cold season exerted a favourable influence on the more delicate plants cultivated in the conservatories, while the show of orchids was the most magnificent that has been seen for many years. A large number of the numerous trees planted during the past few years have grown well, and the garden now presents a fine park-like appearance, for which the public of Calcutta, no less than the Government, are indebted to Dr. King.

The cultivation of several economic plants engaged the attention of the Superintendent during the year. A fresh attempt was made to introduce the plantain (*Musa textilis*), from which Manilla hemp is derived; but, as on previous occasions, the cold weather proved fatal to every plant of this species. Of the *Rhea* plant, both stems and roots were distributed among persons interested in discovering a proper method of extracting the fibre. Another fibre, which has lately attracted considerable attention, is bow-string hemp, the product of the plant *Sansevieria Zeylanica*. Although not indigenous, the tree grows well in Bengal, and the fibre is said to be admirable, while it is easy of extraction from the plant. Dr. King reports as follows on the Japan paper mulberry:—

"In several of my recent reports I have referred to the Japan paper mulberry as a hopeful source of paper fibre for Bengal. I am happy to say that the trees of this species in the garden continue to grow well. Although now only three years old, they are twenty-five feet high, and have proportionately thick steams. The fibre contained in the bark is one of the best materials for paper known. It is easily separated, is strong, and requires little bleaching. As the tree grows thoroughly well and coppices freely, I think it quite possible that, in the course of time, natives may be induced to grow it on the odd corners of land which are so common near Bengali villages."

The *Sabai* grass, the suitability of which as a raw material for paper has been established beyond doubt, is now largely used in local manufacture. Attention has lately been given to an important alkaloid, called cocaine, which is extracted from the leaves of the cocoa plant; and this plant is now being propagated to a large extent for distribution.

There have been considerable additions to the collection of dried plants, the contributors being Sir J. D. Hooker, Mr. Kunstler, Mr. Gamble, Mr. Duthie, Mr. Talbot, Dr. Cook, and several others. The interchange of seeds and plants went on actively during the year, the issues amounting to 23,433 living plants, and 2,979 packets of seeds; and the receipts to 12,056 living plants, and 1,201 packets of seeds. The receipts from sale of surplus plants amounted to Rs. 1,075-11-6.

The *Lloyd Botanical Gardens, Darjeeling*, which had suffered severely in recent years from the depredations of cockchafer grubs, were comparatively free from this pest during the year under review. The grub has gradually disappeared, and the garden has once more been stocked with varieties of plants. It is to be hoped that the grub, which is said to be extending its ravages in the Darjeeling district, will display no partiality for tea. Dr. King states that there is some possibility of the site of the old municipal vegetable garden, situated between the Eden Sanitarium and the Botanical Gardens, being used either for dhobies' huts or washing tanks. The Lieutenant-Governor considers that this would be most undesirable, and trusts that Dr. King may be able to make some arrangement with the Municipal Commissioners to prevent it. A special report on the subject should be submitted.

The thanks of the Lieutenant-Governor are again due to Dr. King and his subordinates for the excellent work done during the year. For the first seven months of the year Dr. King was on furlough, and his duties were carried on by Mr. Brace, the Curator of the Herbarium.

DON'T DIE IN THE HOUSE.

"Rough on Rats" clears out rats, mice, beetles, roaches, bed-bugs, flies, ants, insects, moles, chipmunks, gophers.

A. W. Mason & Co., Calcutta, Sole Agents.

Miscellaneous Items.

THE representative of the *Bombay Gazette* at the Poona Fine Art Exhibition says:—"The pottery ware exhibited by Mr. Terry from the Art Pottery Works, Bombay, attracted considerable attention, as also did a few exhibits from Madras sent by Mr Chisholm as the result of experiments conducted with indigenous materials. I was enabled to compare two fragments of the Bombay and Madras pottery, and found the latter a much closer grained ware. Although I am credibly informed that the two vases are made from exactly similar clay, I can scarcely believe it, there being such a difference between the spongy Bombay production and the hard, close pottery sent by Mr. Chisholm."

MONSIEUR CLEMENT THOMAS, the Chief of the Service at Chandernagore, reports that the torrents of rain which fell incessantly at Chandernagore, from the 21st to the 25th August, caused considerable damage, especially to the Indian part of the town, and among the dwellings of the poorer classes of natives The damage to public property is estimated at 5,000 francs, and the Mayor urgently demands 8,000 francs for the immediate relief of the sufferers by the floods. The Governor of Pondicherry has devoted 3,000 francs out of the subvention of 500,000 francs, voted by the Chambers on account of the inundations at Pondicherry and Karikal in November and December last, for distribution amongst the more pressing and needy cases at Chandernagore.

SOUTH AUSTRALIA is passing through an unexampled period of depression. Never before in the history of the colony has the number of emigrants exceeded the number of incomers. During the first six months of this year, however, only 3,594 people went to the colony as compared with 8,571 who left it. Some anti free traders have been unduly exalting protection as represented by the sister colony of Victoria, and have asserted that this protection has attracted the people from South Australia, where free trade exists; but the examination of statistics showed at once that this was a fallacy. South Australians are content to wait for a turn of the tide, considering that the adoption of empirical remedies must aggravate and not remove the evil. Meanwhile, "intending" emigrants must remember that depression is felt beyond our shores.

THE Mysore Dewan has sanctioned the introduction of the Arabian date tree, which is to be cultivated as an experimental measure in the province. Steps have been taken, through the British Consul in the Persian Gulf, to obtain a supply of the proper variety of the date palm, and it is expected that 400 or 500 young shoots will arrive shortly The date palm, which grows luxuriantly in localities that have a scanty rainfall, will, it is hoped, do well in the Chitaldroog and Kolar districts and part of Tumkur, where the rainfall is precarious, and far below the provincial average. Should the experiment turn out a success, and the cultivation be largely extended, it will prove a stand-by in times of scarcity. Old records show the Arabian date flourished in the Lal Bagh many years ago, but the trees were either cut down, or allowed to perish from neglect.

NOTWITHSTANDING the heavy fall of rain recently in Bangalore, the prospects of the season in the province seem as desperate as ever. The fall appears to have been local, and from all directions the cry of threatened famine continues to come Kolar will suffer in particular, the crops having all perished, and rain still holding off. In truth two successive seasons of drought have already told on the district, and emaciated subjects, suffering from want of food, may be seen about the country The Dewan, it is understood, has determined to face the impending disaster, and is concerting with the Resident measures for mitigating it as much as possible. Relief works will be immediately started in the worst affected parts. Remissions of assessment must of course be liberal, and the whole result will be a black look out for the Mysore exchequer.

THE annual Administration Report of the Department of Horse-breeding Operations for 1884 85 shows the total number of stallions to have been 79 at the end of the last official year. Out of this 6 died during the year under review, 6 were destroyed, and 9 sold as being unfit for stud purposes. The number of new stallions that was received amounted to 15, one of them being presented to Government by Surgeon-Major Gaye. This left 75 on the roll on 31st March, 1885. Eight of these were thoroughbred English, 17 Norfolk trotters, 50 Arab, and 1 Australian. Out of these one only has turned out bad, and two others had not been judged. Of the rest, numbering 72, some of them are pronounced good and some fair, though the animals of the latter class are said to have become too old for stud purposes. The bad lot has, since the close of the year, been ordered to be sold. These serviceable stallions have been distributed over Gujerat and Kattyawar, Sind, and Cutch, and Beluchistan, but mostly in the Deccan.

Selections.

ENSILAGE AT THE ROTHAMSTEAD LABORATORY.

SIR,—Being questioned during the autumn of 1882 by numerous correspondents as to the nature of the several chemical processes through which green fodder passed in its conversion into ensilage, I replied, both publicly and privately, that, being no more than a very humble observer, taking notes of plain facts that came under the observation of practical experience, I could not venture on the domain of chemical research; but I added that I felt assured of the speedy accession of scientific inquiries to aid in fixing the position to be taken by the new cattle food at that time just revealed to the agriculturists of Great Britain. Truly the foregoing forecast has been abundantly fulfilled, for each succeeding season has furnished us with a number of analyses by eminent men throughout the country.

Committees, too, appointed by bodies having more or less authority (the most recent being of 'quasi' Governmental creation) have investigated the subject, and the whole series of such inquiries have culminated in the issue of a set of very interesting statistics from the pen of Sir John Lawes The word 'culminated,' is used here because to many agriculturists it appears a strange eccentricity of fate, that from Rothamstead, of all places in the world, should come a report that could in any way be construed as supporting the new system Has it not become almost a household word that the eminent directing mind at this famous spot positively *banned* the whole thing in its infancy as being a sort of 'will o' the wisp' kept dangling and dancing over the morass of depression to the misleading of the already too much distressed British farmer? Sir John's former outspoken opposition is here referred to with the most respectful deference, and is only alluded to, to demonstrate the fact that ensilage is possessed of a feeding power the position of which, in comparison with other foods, has been fixed by him with severe impartiality, and that we must surely be justified in taking his results as a basis of unquestionable authority from which to proceed with further inquiries The sum and substance of Sir John's labour may be taken to be that ensilage can fully hold its own with mangolds and the best of other foods for feeding and fatting purposes, but that for the production of milk the other foods have by a small fraction the best of the trial. Now, Sir, what I particularly wish should be made known as widely as possible is the important fact that the above decision virtually places all occupiers of heavy land almost on an equality with their more fortunate brethren on light soils, and that a succulent, nutritious winter food is now possible to be obtained by every farmer in the kingdom.

There are many plain, plodding, practical laymen who thoroughly believe in the outcome of scientific investigation, but yet cannot help feeling that in all such inquiries some important points or ideas are often omitted. Probably this is unavoidable, but to the mind of the practical observer every important subject is fringed round with others, of less import no doubt, but still bearing with more or less force on the central question. To illustrate what I mean, we will take one, only one, of these secondary affinities to the main subject before us. Sir John Lawes, in experimenting, pitted mangolds in combination with other foods against ensilage in combination with other foods. So far so good. But I venture to think it would have been highly interesting if he had set one against the other—each entirely by itself. Thus we would have had given a diet solely of mangolds morning, noon, and night for one, two, or more weeks consecutively—nothing else given but water and ensilage, dealt with in the same manner. If a course like this could be followed out, something instructive and interesting would almost certainly be learned therefrom.

Experience here with ensilage has now extended to four seasons. Our doings during the first two of these were frequently laid before the public. As, however, by the end of the second season other and more able pens in large numbers took up the refrain, we gladly lapsed into silence, feeling assured that the system, if allowed a fair field, would hold its own. Mr. Stobart (the owner of this estate) continues to hold the same favourable opinion of it that he did at first. In 1884 he had, and again this year he has, in his silos upwards of two hundred tons of ensilage, and he is content in the assured feeling that he has in store something that will successfully meet the exigencies of the coming winter, as far as these are connected with his herd of cattle. Each winter he feeds upwards of 40 fat beasts, milks from 16 to 20 cows, and carries through upwards of 60 store cattle of various ages, and all of these, without exception, have a share of the ensilage.

Having been frequently asked to give an opinion as to how heavy arable land could be best utilised for silo work, I should be glad, with your kind permission, to describe what Mr. Stobart has done this season with some 7 acres of fair average heavy land. Early in April this piece of land was sown with oats; on the 30th of July and August 1 they were cut and put into the silos. During the following week the land was manured and ploughed—the plough used being Ransome & Sim's 'patent chill-breast digger.' (This implement does its work splendidly, laying up and breaking the soil as if done by hand labour; indeed, so well does it perform its special work, that if better known it would surely become indispensable on every heavy land farm.) The usual course of harrowing, &c., has followed the ploughing, and the land is at the present moment a good fallow, ready to be ridged up for autumn sowing.

Thus Mr. Stobart has secured a crop and made a fallow in one season, where, under ordinary circumstances, the oat crop must have been taken *now*, and the fallow made next summer. It may also be noticed, in this connection, that silo crops are taken when in a green state, and are, threfore less exhaustive to the soil than if left to ripen.

When silos were first introduced into England the late cycle of rainy seasons were at the height of their baneful influences, and it was generally allowed that the crowning benefit of ensilage was to consist in counteracting the disastrous effects that so much wet produced on the quality of hay; but last year and again this year the drought is teaching us the additional important lesson that ensilage can prove as great a boon in dry seasons as in wet ones. On much of the tract of land which it is my duty occasionally to traverse, I find the turnip crops are virtually a failure. Almost every attempt has resulted in disappointment. Look, for instance, at that field before us, and on the majority of farms you will find its exact counterpart.

What does those ragged rows of stunted, aphis-covered, sickly-looking plants represent? Why days and weeks of heavy and painful drudgery to man and beast, and a heavy outlay of capital—the result to the husbandman being loss and disappointed hopes. He must, in consequence, also look forward to the almost certain selling (at a sacrifice) of the best of his store stock; and those calving cows also which the wife had quite reckoned on having to make butter from during winter—must they go too? While, on the other hand, happy is the man who in such a case has a well-filled silo to fly to. With this succulent, nutritious store at hand from which to draw at will, he can possess his mind in peace; for has he not the judgment of the highest authorities connected with the science of agriculture as a guarantee that good ensilage is fully equal to mangolds as food for his cattle?—Yours, &c.,

THOS EASDALE.

Estate Office, Pepper Arden, Northallerton,
September 5, 1885.

—*North British Agriculturist.*]

A FINE COS LETTUCE.

TO THE EDITOR OF THE "PIONEER."

SIR,—In the Lucknow Horticultural Garden is grown an acclimatised cos lettuce, with a selected pedigree of upwards of 15 years. No newly imported kinds come up to it, as far as suitability to this climate is concerned, yet it is hardly known beyond the sphere of official reports. It is a large and tall cos variety; the tips of the leaves cabbage or fold over each other, so as to blanch the inner leaves, without the bother of swathing. Please note what those who have tried it have said about it. Some years back a trial of the Lucknow cos lettuce seed was made at the Saharunpore Botanic Garden, which resulted in the following report: "A splendid variety; three sowings were made, and all made heads superior to any imported variety we had. Enquiries were made by parties who received it in *dalees*, where the seeds were obtained from." (!) In 1883 I sowed some seed of this superb cos lettuce in Etawah, and sent some heads of it to friends. They said they never saw anything like it for size, whiteness, sweetness, and crispness. Last year I grew it again. I sent a few heads of it to a lady who had come to Etawah. She said she never saw anything so good. On returning to Agra she asked me to send her some heads of this lettuce, that she might show the residents of Agra what fine lettuce ought to be like in India. Later on she did not forget to write for some of its seed. Now there is a little secret about growing lettuce for *seed*, which may not be generally known, and which the sooner it is learnt, the more easily will the grower be able to improve his seed for future sowings. First, always get hold of the best acclimatised strain possible. Second, sow the seed, *not too thickly*, in well prepared beds of rich soil, in October (in the N. W. P. and Oudh.) Third, when big enough to handle prick out the young plants carefully 12 or 18 inches apart, in rich soil of the best quality, where they can get plenty of air and sun. Water at once with a rose, and then irrigate the beds regularly at intervals, and watch the result. The growing lettuce should never want water, that is, it should never be checked in growing; being a leaf-vegetable, it should have the richest possible soil. Of course weeding and other culture must be attended to. *Choola* ashes appear to suit lettuce, but of course it is possible to give too much of a good thing. When the heads are coming on towards being fit for the table you will find that most of them will fold the tips of their inner leaves one over the other, that is, they *cabbage*. *These* are the ones you should select for seed. Do not fancy for a moment, however, that you lose the heads for the table by keeping seed from these plant. Not a bit. When the head is ready for use, *cut it off* close to the ground, leaving only three or four leaves on the stump. Plunge the head in clean fresh water at once, and use it afterwards as required for salad. Within a week or so you will see little sprouts coming up from the stump. These are the *side shoots* of the lettuce, and it is *from these only* that good seed for the next generation can be obtained, that is, if you wish to have lettuce that will *grow* slowly and cabbage, and will not "run off into flower like rockets." Please note also the following:—Any lettuce heads which do *not* cabbage and remain open like endive, take up scrupulously *by the roots* and do what you like with them. This you must see done yourself, as your *malee* will not do it, but will leave the stumps of the open-headed lettuces *also* in the ground, the shoots of which would seed like the rest and leaven and spoil your stock with lettuces fit only for cows and goats. The stumps, with their flowering stems, should be irrigated regularly as before until you gather all the seed you want. Remember the seeds, when ripe, are attached to little tufts of cotton, and will be soon blown away anywhere after expanding. They should therefore be collected daily, after the sun has dried off any dew. A second selection may be made while the flower stems are growing. The fewer stems you leave on each stump, the more nourishment will they get and the stronger will the seed ultimately be. The stumps of the earliest heads taken off *cæteris paribus* are likely to give better seed than the latest. The former will have a good bit of the cold weather to grow and perfect themselves in, while the latter will have the beginning of the hot weather to do it in. Yet a third selection may be made. By winnowing the seed, after cleaning it in a gentle breeze, over an extended sheet, you will be able to separate the plumpest, and therefore the soundest and heaviest seeds from the chaffy, light ones; the *former* is what you should keep for stock. If you follow this advice strictly, and see to it now and again yourself, you will not be disappointed with your acclimatised seed. Moreover, by growing already acclimatised seed and keeping your own every year, this lettuce will adapt itself, with a little intelligent modification in the treatment, to all the climates of the N., S., E., W., and centre of India. One word more about the seed. As it would be useless to go to war without keeping your powder dry, so would it be useless to take all the foregoing trouble about nursing and selecting if, *after all*, you do *not keep your seed dry*. Bottles well corked or tin boxes with tightly fitting covers—never too full—are the best for keeping seeds in. Take advantage of dry bright *sunny* days to air and sun your seeds on a blanket spread on a charpoy (not on the ground), with a boy to watch the squirrels. Now there is a reason for most things in this world, and the reason why the side shoots of the lettuce plant are better than the main shoots for keeping seeds from in India is this; the main stem tends to shoot up *quickly*, and its seeds will produce plants with the same tendency. Therefore lettuces from the main stem seeds would disappoint you by flying off like rockets into flowering stems before you would have time to consume them, and on the slightest provocation from warm weather and dryness at the roots, while your object should be to make them grow slowly, and have them fit for the table throughout a longer period. This you can bring about by keeping seeds from the side shoots only, which will give plants that will grow more slowly. Remember that the winter in India is very short; no sooner are you rid of the rains and their hot-house atmosphere than the coldest part of the winter is upon you (when most vegetables are at their best), and the next warm weather soon following up. Curiously enough, natives do not care about lettuce, although they who are fond of eating raw vegetables might eat the raw blanched and sweet leaves with advantage, especially if they first dipped them in lemon juice and then in salt. I use this fine cos lettuce, however, every winter for prisoners, while I keep the stumps of the prime ones for seed. In the prison the lettuce are chopped up and boiled as other vegetables, and a fine thing they make when properly done up. For soldiers nothing could be better than this fine vegetable. Last of all it is not impossible that this lettuce grown largely without much richness of soil would yield an opium called *Lactucarium* which is useful in medicine. It is collected from incisions in the flower stalk, and the root is said to yield an extract which is stronger than that made from the leaves. The medicinal properties of *Lactucarium*, or the extract, are said to be sedative, narcotic, gently laxative, and powerfully diuretic. Whether the cultivated kind can be made to yield this apparently useful drug is, however, a matter for experiment.

E. BONAVIA, M.D.

ABOUT THE SUNFLOWER.

Some few weeks ago we were sitting with some "old reliable" farmers, talking over different methods of farming and new crops. The conversation turned to the subject of sunflower culture for stock and poultry feeding, and we concluded to give our readers a few remarks on the subject.

"The seeds of both the common and dwarf sunflower yield an oil little inferior to that of the olive for domestic purposes," says Lawson, so thus at the outset of our researches we come on a valuable use for this plant. In Portugal, we find that the seeds are made into bread, as also into a kind of meal, and here in America they have been roasted and used as a substitute for coffee. The greatest objection to the cultivation of sunflowers is that they require very superior soil, and are a most impoverishing crop, particularly the taller growing sort (*Helianthus annuus*), from which circumstance the dwarf species (*Helianthus Indicus*) has been preferred by some cultivators, specially in France, who assert that as its dwarf habit of growth admits of a greater number of plants being grown on a given space, it is not so much inferior to the other in quantity of produce as, from its appearance, one would be led to expect. In addition to the uses above mentioned, some French authors assert that the leaves, either in a green or dried state, form excellent food for cows, and that they are greedily eaten by them. The stems also are valuable for fuel, and indeed are used for that purpose in some vicinities.

Sunflowers are best cultivated on hills, like field corn, but may also be used to fill up odd corners, and in time may attract more attention as a field crop than they do at present.

HARVESTING.

When the stem and discs of the sunflower become withered, and the seeds shining and dark colored, the plant is ready to be harvested. It may be simply pulled if weak, but out west here, those we have seen would better be attacked by an axe, as in tree felling, or a good, heavy, sharp, corn knife will answer the purpose. The discs are afterwards cut off with a sharp knife and the seeds rubbed out.

Lawson says that from 30 to 40 bushels of seed on 1 acre is a fair crop of sunflower. These will yield 50 gallons of oil, the refuse will make 1,500 pounds of oil cake, and the stalks burnt into ash will afford one half ton of potash. Professor Johnston mentions that the seed yields 15 per cent of oil.

COMPOSITION.

The analysis of sunflower seed and cake compared with flaxseed meal and cake is as follows

	Water.	Albuminoids.	Fats.	Carb Hydra.	Ash.
Seed ...	8 0	13 0	21 0	7 7	3 0
Cake	10 0	34 2	11 0	17 0	10 6
Flaxseed meal	9 7	34 2	3 9	29 3	7 3
Flaxseed cake	11 7	28 3	9 0	20 0	7 7

In order that our readers may fully comprehend the value of the above analysis and form for themselves a comparison between the two seeds given, we shall explain the uses in feeding of the different component parts mentioned.

Water—Is absolutely necessary as a vehicle of plant-food and for carrying on the vital processes.

Albuminoids—Nitrogenous matters which go to form the flesh of animals, also gelatinoids and some of the fat, 100 parts of albumine yielding 51·4 of fat ;— by combustion in the animal body these yield heat and mechanical force, repair waste of nitrogenous tissue, and supply in themselves most of the requirements of the animal.

Fats—Go to form fat in the body, but many change into a different kind : they are burned in respiration to give heat and mechanical force, and thus are "fat formers" and "heat givers," one of fat equals 2 44 of starch in food value.

Carbo-hydrates—Include starch, sugar, gum, dextrine, mucilage, etc., and are more immediately used for heat and mechanical work, but if taken in excess they are laid up as fat. They form the largest part of all vegetables.

Ash—The incombustible or mineral part of plants or foods, consisting mostly of salts, and going to form bone, blood, etc., in the animal.

From the above it will be readily seen that sunflower seed and cake is quite a valuable feeding stuff, deserving of trial by all stockmen.

We shall welcome any experience which our readers can give regarding the cultivation, yield, or value as a feeding stuff.—*Farmers' Review.*

PEACH GROWING IN AMERICA.

We hear occasionally of a planter, who tired of the vicissitudes of coffee or tea planting takes orange growing in Florida or peach growing in Georgia. Some marvellous stories have been circulated about success in these departments. Let us see what Mr. Parnell, a brother of the Home Rule leader, says about peach growing—"In my early days," said Mr. Parnell to a correspondent who interviewed him, "I was advised that there were excellent chances for investment in the South, and especially in Georgia. It was my idea that thus located there was money in cotton, so I paid cash down 12,000 dols for 1,500 acres. To this original purchase I have since added 500 acres, making my possession 2,000 acres in all For three years I planted cotton only to find it a delusion " It was in this fortunate moment that Mr. Parnell made up his mind that there was money in peaches. The great peach forest is described as containing acres and acres of ground, stretching indeed into miles, covered with every variety of tree. The trees, which number 150,000, are planted twelve feet apart, and are kept trimmed to the ground, so that a person standing can pick the rosy fruit from its fastness. When the first blush comes upon the cheek of the dainty beauties, 100 men, women and children are set to work, each armed with a flat basket, returning to the rendezvous when the bottom is covered. Thus they keep on day after day until the season is over. The story of Mr. Parnell's venture is briefly this :—He invested 12,000 dols. in his plantation. He has spent over 6,000 dols. since in trees, seeds, and labour. Upon this investment he makes from 8,000 dols. to 10,000 dols a year, and would not sell his peach forest for less than 300,000 dols. Great as Charles Stewart Parnell is as the uncrowned king of Ireland, greater is John H. Parnell, the peach king of America. "I found it necessary to have recourse to English varieties. It was clear that a hard, firm peach which would bear handling would be a gold mine. In 1871 I brought from England 5,000 budded trees - the Beatrice, the Early Rivers, and the Early Louise I have found that these three varieties meet every requirement. I have developed a hybrid, to which I have given the name of Parnell. The peach is destined to rank in the peach family as the Le Conte does among the pears. I secured it from an accidental seedling. I made my first shipment of this peach five years ago, when it went off at 25 dols. a bushel. I have now seven thousand trees of this variety. It has a dark red skin, white flesh, and is firm and hardy for shipment The next is the Foster, a peach of yellow skin, saffron flesh, and firm mould. But one crop in three of this peach, however, is fit to ship. Of the Amelia peach, dark fleshed and brownish red cheek, I have over 6,000 trees. I have spent much time in experimenting, and believe that I have now solved all the difficulties of this neighbourhood. As old trees die I replace them, and also make a regular annual increase of 25,000 trees." "The worst enemy of the peach orchard," remarked Mr. Parnell, "is the half taught horticulturist with a pruning knife. There is no doubt but that peach trees understand the art of growing, and should be let alone. The borers will not do as much harm as the man who tries to exterminate them. If a trees yields bad fruit, just cut it down and plant The principal danger, however, is winter killing, which is a misnomer because the killing takes place owing to the absence of winter. Where no winter comes the sap never sinks. A sudden cold day chills the tree, just as it does a man. I have fully exploded one idea prevalent, that it won't do to plant a new orchard upon the site of an old orchard. Thousands of my best trees are standing upon ground which has been the site of half-a-dozen previous orchards Trees set out to the north-east never fail to have fruit. Peaches flourish in alternate years, sometimes one variety, and sometimes another. In 1875 there was a wonderful yield of early peaches In 1878 the crop was equally good, but in 1879 there was a peach famine, which caught me two ways. The famine in Ireland deprived me of my rents, and the famine in peaches deprived me of my income here In alternate years since, with wonderful regularity, the yield has upheld the theory. The earliest shipment ever made to New York was on the 16th of May, and the latest the 10th August, when the Delaware crop cuts off the Georgia sales. The demand for good fruit has never yet been met. I always have more orders than I can fill."—*Home and Colonial Mail.*

CINCHONA IN BOLIVIA.

The United States Minister at *La Paz* has something to say to his government relative to the cultivation of Cinchona in Bolivia. The scientific cultivation of quina in plantations has now been carried on for about seven years, and the districts in which it is chiefly practised are Mapiro, where 1,500,000 plants are cultivated; Longa, 500,000 plants ; Yungas, 1,000,000, ; and Guanay, 500,000 ; making a total of 6,500,000 plants. Where the principal *quinales* are, it is a very rough and broken country, the Andes being cut and seamed into deep valleys in every direction. The trees are planted on the sides of the valleys or ridges, in altitudes of about 3,000 to 4,000 feet above the sea. They will grow higher up, even to 6,000 feet, but in that case they are stunted, and will give little or nothing of what is called quina salt. The plants require a great deal of sun, heavy rains, and fresh winds. A tree will yield from fifteen to twenty pounds of seed. The seed is collected in November and December, which in Bolivia are the early summer months, and are planted very thickly in boxes or beds, about twelve feet in length and three feet in breadth, and placed on a slight decline and well irrigated. When the plants are about six inches in height, and have a few leaves, they are transplanted; holes of from eight to ten inches deep are dug about six feet apart, in which they are placed. The plant is then covered partly over with twigs and other light stuff, grass and leaves, to keep off the sun for about three months. When the plant is strong and healthy, the undergrowth of other plants is cleaned out, great care being taken in conducting this operation. This attention to the plants continues for about two years, and then they are left and considered sound. About 25 per cent of all the plants decay or rot before they come to maturity. When the tree is six years old, it is about fourteen feet in height, and has a diameter of about six inches up to six or seven feet When the bark is of the most productive kind, the trunk grows straight and slender, and has the form of an orange tree When a tree is left standing for ten or twelve years, it is over a foot in diameter, and the bark is thicker and heavier, but not so productive in quina The bark is ready to cut when the tree is about six years old. A transverse incision is made in the trunk of the tree a few inches from the ground, another incision some twenty four inches higher up and two vertical incisions opposite The bark is pulled off in two pieces. Two cuts and sometimes three are made in each tree twenty-two or twenty four inches long, and seven or eight inches wide. After the tree is stripped it is cut down, leaving a trunk about a foot above the ground, and from the base where the bark has been left there spring out about fifteen or twenty shoots or sprouts; these are left growing until they are a little higher than the stump, and are then thinned out, only two or three being left. The trees produce on an average about four or five pounds of bark, and the bark is placed in paved yards, and is generally cured in four days, but in rainy seasons it requires nearly three weeks.—*Home and Colonial Mail.*

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

THE disease commences with a slight derangement of the stomach, but if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions, he will be able to determine whether he himself is one of the afflicted:—Have I distress, pain, or difficulty in breathing after eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste? Is the tongue coated? Are there pains in the sides and back? Is there a fullness about the right side as if the liver were enlarging? Is there costiveness? Is there vertigo or dizziness when rising suddenly from a horizontal position? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach? Is there frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses If the case be one of long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty, brownish appearance, and the hands and feet are covered by a cold sticky perspiration As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantity of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine venders throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market Place, Pocklington, York, Oct. 2, 1982.

Sir,—Being a sufferer for years with dyspepsia in all its worst forms, and after spending pounds in medicines, I was at last persuaded to try Mother Seigel's Curative Syrup, and am thankful to say have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same complaint to give it a trial, the results they would soon find out for themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. TURNER.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition They cure costiveness.

St. Mary street, Peterborough, Nov. 29, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup I have been troubled for years with dyspepsia, but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,

MR. A. J. WHITE. WILLIAM BRENT.

Hensingham, Whitehaven, Oct. 16, 1882.

MR. A. J. WHITE.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) JOHN H. L[illegible].

August 15th, 188[illegible].

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.—Yours truly,

(Signed) N. W[illegible].

MR. WHITE. Chemist, Calne.

September [illegible], 188[illegible].

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer describes it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Signed) VINCENT A. W[illegible].

Chemist-Dentist,

TO MR. A. J. WHITE. Merthyr Tydvil.

Preston, Sept. 21st, 188[illegible].

My Dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said, "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully; in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.—I am, dear Sir, yours faithfully,

(Signed) W. BOWKER.

To A. J. WHITE, Esq. (A)

THE TROPICAL AGRICULTURIST:

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THE

INDIAN AGRICULTURIST.

A WEEKLY

JOURNAL OF INDIAN AGRICULTURE MINERALOGY, AND STATISTICS.

VOL. X.] CALCUTTA :—SATURDAY, OCTOBER 17, 1885. [No. 42.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 7TH OCTOBER 1885]

Madras.—Partially withered dry crops in Bellary wonderfully revived, later sowings thriving, wet crops moderately good, communications interrupted by heavy rain. Standing crops fair small-pox in two taluks, cattle-disease in one of Kurnool. Rain much wanted in Ganjam. In Kistna, standing crops thriving; harvest *cumbu* and [illegible], outturn below average. In Chingleput, standing crops generally good, but withering in parts. Fever abating, but anthrax in three taluks and small-pox in one. In Tanjore, dry crops much improved by recent rains; fever and cattle-disease in parts, 13 deaths from cholera. In Coimbatore, standing crops generally good, but in Colegal much paddy has been lost, harvest paddy, *cholum*, and *ragi* in parts, outturn about average. General prospects *fair*, much improved in Bellary and Anantapore.

Bombay.—Weather sultry. Fever in nine and cattle-disease in three talukas. In Kurrachee damage to crops in Tatta, Dadu, Sehwan, and Johi talukas, owing to drought, and in Ghorabari taluka to salt-water freshes. Rats doing damage in Jath taluka. In Sholapore, *kharif* crops doing well, *rabi* sowings commenced in lighter soils. A break in rain required. In Dharwar, more rain required in Bankapore and Kalghatgi. Rice crops which were withering are reviving; *juari* and other crops good; cotton sowing in progress everywhere except in Navalgund and Gadag, where a break is required. In Kanara, rice crops thriving; harvest commenced on coast. In Rajkot, crops unhealthy in many parts, owing to want of rain. Good rain throughout the Deccan and Southern Mahratta Country and in parts of Guzerat. More still wanted in north of Guzerat, where the crops are withering. Sowing of *rabi* crops in progress in several districts, standing crops injured by drought and rats in parts of Kurrachee, by storms in parts of Hyderabad, and by blight in parts of Rutnagiri. Cholera and fever in parts of twelve, and cattle-disease in parts of eight districts.

Bengal.—In Chittagong, weather seasonable, standing crops in certain localities damaged by grubs. In Dacca, prospects of crops good, harvesting of jute and *aus* nearly completed, early *aman* blossoming. In 24 Pergunnahs, prospects of *aman*, except on low inundated lands, are good, harvesting of *aus* going on, estimated outturn 10 to 12 annas. Prices of common rice 10 seers, 10 chittacks to 15 seers per rupee. In Moorshedabad, weather seasonable. Prospects of *aman* in the north excellent, *kalai* being extensively sown and doing well, prospects generally much brighter. In Rungpore and Bhagulpore, prospects of winter rice good, *kalai* and *kurthi* being sown, rice 10½ seers per rupee. Cholera decreasing. In Purneah and other districts, crops doing well, and growing of cold weather crops progressing. Rain in almost all districts. Prospect of crops generally good except in the inundated tracts in the Burdwan and Presidency Divisions and in Behar, and also on the Orissa coast, where stricken by cyclone. *Bhadoi* crops yielding fairly, where not damaged by floods. Price of rice getting easier in some districts, Public health generally good, though prevalence of fever and cholera is reported from some districts.

N.-W. Provinces and Oudh.—Paddy being cut; other crops doing well. A slight sprinkling of rain in places, more needed. General prospects, however, good. Cholera and fever somewhat abating, and so is cattle-disease; general health is good.

Punjab.—Slight rain in the Ferozepore and Rawul Pindee districts. Fever prevalent in the Hissar, Delhi, and Peshawur districts, and in the Kahuta tahsil of the Rawul Pindee districts. *Rabi* operations in progress in the south-east. Prices fluctuating. Health good in all districts.

Central Provinces.—There has been a timely fall of rain in Nimar, but more is required, especially in Raipore, where crops are reported to be withering. Prospects continue fair in all other districts. Prices steady.

British Burmah.—Cholera slight in five districts; fever slight in one district; elsewhere public health good; cattle-disease slight in eleven districts; elsewhere health of cattle good. Crop prospects good.

Assam.—Days warm, nights cool. Reaping of *aus* and transplanting of *sali* crop finished. Common rice 14 seers 8 4/5 chittacks per rupee.

Mysore and Coorg.—Rain has fallen throughout the State. Standing crops improving, agricultural operations general. Horse gram being generally sown; irrigated *ragi* and *juari* harvested in Tumkoor district. No material change in prices. Prospects of the season considerably improved by the recent rains. Public health good. Water-supply and fodder available. Murrain reported in parts of Mysore, but generally cattle improving in condition.

Berar and Hyderabad.—In Amraoti, crops progressing favourably; grain sowing commenced. In Akola, weather sultry. Crops in good condition except in Akote and Jalgaon taluks, where more rain is wanted. In Hyderabad, rain beneficial to standing crops, except in Shahabad taluk, where *kharif* crops are slightly damaged. General health fair.

Central India States.—In Indore, prospects improved, and prices of food grain falling. Fever still in Morar and in Lashkar. Cholera reported from several districts of Rewah state. In Goona, weather cloudy. In Sehore, prospects of crops unfavourable, rain much needed. In Nowgong, weather clear. Prices steady. Health generally good in all districts.

Rajpootana.—In all districts tanks fairly full; wells good. Health good. Crops being cut in Sirohi, where weather very warm and dry for time of year. Rain wanted more or less, for the crops in Mhairwara, Partabgurh, Meywar, Harowti, Jhallawar, Ajmere, Jeypore, Ulwar and Bikaneer, crops in danger of being damaged for want of rain in Marwar.

Nepal.—Cold weather set in. Prospects good.

Letters to the Editor.

ORANGE CULTIVATION AND MANGOE PESTS

TO THE EDITOR.

SIR,—I have read with great interest the letters of "T," *An Old Mallee* and Mr. *Gurumurty*, which appeared in your issue of the 10th instant, on the above subjects; and I will feel obliged if you will permit me through your columns to say a few words also. I do not agree with *Old Mallee* as to the soil recommended by him for general use for the orange, his process will not be productive of good results in every climate and soil; perhaps it might in his own garden, but it may have a different effect in a place where "T" desires to cultivate the orange. As to the very best method of raising orange trees, it is a fact that trees raised from seed, generally not more than ten per cent are good. The reason for this I believe is, that good seeds are not selected. Many seeds lose their vitality very early after being gathered. Most of our *mallees* exercise no discretion in selecting and sowing seeds, and that is why you do not get a sufficient number of good plants. It is worth mentioning that budded trees are invariably two years *later* in producing their fruits than grafted ones. Budding is only resorted to by experienced horticulturists where a tree is rare. [*We have never heard of this before.*—ED., *I.A.*]

In the 3rd para. of his letter *Old Mallee* writes:—"Another point which I think worth mentioning is that I change my stock of fruit-bearing trees, after three years of full bearing. After 13 years' experience in the cultivation of the orange, I have found that when trees bear their full crop for three successive years, they begin to die off most unaccountably. I can assign no scientific reason for this." But your able correspondent makes up this deficiency by keeping a stock ready in the nursery, and planting out between the old trees from the time they first begin to fruit. This appears to me to be very true, but it can be rectified [by another method]:—Dig up the surrounding ground of every tree in November and December after removing the fruits, and remove the old earth, and lay up in a rough state for a couple of days or more (not longer than a week) giving as much surface as possible, so that the atmosphere may act upon the soil, and then fill up the parts thus dug with a compost made of sandy loam from old pastures, 3 parts, and one part of pigeons' dung, then cover with some fresh earth, and water the trees regularly in the morning till the trees blossom. This will not only render the trees healthy, but will improve the soil and make the trees more fertile than before.

As to Mr. *Gurumurty's* questions, I would recommend him for the first to adopt the following method: loosen the soil round the roots and remove the old earth, clear the roots with a hard brush, then paint them with a solution of tobacco leaves 1 part, fresh lime 2 parts, and soap-suds 1 part, then cover the roots with earth composed of pigeons' dung, and water regularly, both in the morning and evening, till the trees begin to shoot out new leaves; or he may act according to the method suggested in my letter which appeared in your paper of the 9th May 1885. For the second, I would say that pigeons', rabbits', and hogs' dung, rotten cow-dung and slaughter-house offal and coal ashes (fresh) are very good fertilizers. For the last, I would refer him to my letter which appeared in your issue of the 1st August 1885. I would ask Mr. *Gurumurty* to try both your and my methods partly, and make known the result through your valuable paper.

HEM CHUNDRA DUTTA.

October 12, 1885.

Editorial Notes.

We understand that in August last the Mysore Gold Mining Company crushed 153 tons of ore, which yielded 366 ounces of gold.

⁂

Locusts, it appears, have made their appearance in a village of the Trichinopoly district, and are reported to be damaging the growing crops of sugar-cane, ragi, and samba paddy. Arrangements have been made to watch and report their appearance and movements.

⁂

The collection of models of agricultural implements made by the Madras Government for the Colonial and Indian Exhibition is intended to remain permanently in London, and its cost is to be met from the balance at credit of agricultural services.

⁂

The opium revenue of the first [illegible] months of the current financial year amounted to Rs. [illegible], or Rs. 22,91,420 better than the estimate. The receipts from Bengal opium were Rs. 3,58,666 below the estimate, while those from the pass duty on opium from Bombay were Rs. 26,[illegible] above it.

⁂

The latest reports from the tea districts state that the weather in Assam and Darjeeling continues to be unfavourable, and that the blight is so bad in the Terai that the outturn will be seriously affected. The weather in Cachar has been more favourable, and the blight is decreasing.

⁂

Reuter telegraphs, under date 10th instant, that the Washington Agricultural Bureau's monthly report states that the average condition of the cotton crop in the 10 cotton States is 78 per cent. Reports received state that the crop is injured by excessive rain-storms and worms.

⁂

The total value of cotton exported from the several ports of British Burmah during the month of August 1885, amounted to Rs. 1,52,556, and weighed 6,947 cwts. The export was, however, confined to Rangoon alone.

The total value of imports of all articles during the same period amounted to Rs. 53,78,081. The imports of treasure (silver) were as follows:—

	Rs.
For Government	50,000
„ private parties	3,79,946

There were no importations of gold. The total of exports of all articles for the same period amounted to Rs. [illegible], and of silver:—

	Rs.
By Government	5,000
„ private parties	2,78,826

It will thus be seen that the imports were far in excess of the exports.

⁂

The London season of 1886 promises to prove a most attractive one. In addition to the Indian and Colonial Exhibition, which it is expected will be a gratifying success, there is to be "The American Exhibition of the Arts, Inventions, Manufactures, Products, and Resources of the United States." This Exhibition will open at Earl's Court, Kensington, London, on May 1, 1886; and one of its most instructive and interesting features, we are told, will be the "Industrial Hall," where all the most recently improved machinery will be exhibited in motion. Our American cousins have "gone ahead" of us in this direction, and the Exhibition ought to possess a peculiar interest for the British mechanic.

⁂

We understand that the indigo brokers estimate the total outturn of the present season at 110,000 maunds, a large falling off from the 166,507 maunds of last season. This is considerably below the original estimates. The falling off is confined chiefly to Behar and the North-West Provinces. In the former the outturn is expected to amount to only 52,650 maunds, against 62,038 maunds last year, while in the North-West Provinces this year's crop is estimated at under 40,000 maunds, against 84,300 maunds last year. The heavy rain that fell late in the season has tended largely to reduce the produce from the khoonties in Behar, while the unfavourable season generally is said to have been the cause of the falling off in the North-West Provinces.

⁂

There has been some "hitch" as to the distribution of Mr. Mill's duties. The Government of Madras desired that the course of veterinary instruction at the Madras School of Agriculture should be so arranged as to set Mr. Mills free for the greater portion of the year, or for half the year, for the purpose of mofussil inspection. The Principal of the Agricultural College does not think it practicable, in the interests of the college, that the course of lectures could be so arranged unless the veterinary training is to be greatly restricted, and the curriculum laid down entirely re-arranged. He adds that the touring season would be, under ordinary circumstances, the working season of the college, and that, instead of curtailing veterinary instructions, it would appear to be the intention of Government to extend and develope it very considerably in the college. In this opinion the Principal is supported by the Director of Public Instruction. The Government of Madras have, however, over-ruled this objection by observing that, although Mr. Mills is paid entirely from Agricultural Funds, three-fourths of his time is at present spent in the service of the Educational Department. And that in these circumstances, it does not seem unreasonable to expect that some less disproportionate division of his services should be agreed to by the latter department. The Government, therefore, insist on such a revision of the curriculum at the Agricultural School as will set Mr. Mills free for six months of the year for mofussil inspection. The difficulty of serving two masters is very clearly illustrated here.

⁂

The live-stock maintained on the Saidapet Farm are to be sold, and a certain number of them is to be retained for the use of the Agricultural School. The acting Director of Agricultural, Mr. Price, in submitting his proposals for the disposal of the live-stock has made a suggestion which, in our opinion, is deserving of favourable consideration. It is nothing more than the establishment of a stock-breeding farm. He says that Mr. W. Wilson, the late Director, had, before he quitted his post, commenced instituting enquiries into the matter, the reason being the obvious necessity that existed for the introduction, throughout the presidency, of good breeding bulls; and th want, it was expected, the farm would supply. Mr. Price says that complete information has not yet been obtained, but from what has thus far come to hand, it appears that there is but little doubt that a suitable spot can be found for experiment; and that, if the idea meets with the approbation of Government, it would, he suggests, be advisable to retain the cattle where they now are until a scheme can be worked out. They are reported mostly good beasts, which could not be replaced excepting at considerable cost. If Government do not approve of the plan, the cattle left on hand may be either sold or distributed gratis, whichever Government see fit. They have from first to last cost a good deal, and he therefore does not see why they should not be sold. The Board of Revenue strongly support the proposal for the retention of the cattle, pending preparation of a scheme for establishing a stock-breeding farm which they regard as a great desideratum in the presidency, and the Government states that it will be glad to have the Director's promised scheme for a stock-breeding farm as early as possible.

⁂

THE following is a summary of the health, crop, and weather reports for the week ending 7th October 1885 :—

Good rain is again reported from the Madras presidency—in Bellary especially the fall was heavy; and both in that district and in Anantapore prospects have much improved. Elsewhere prospects are fair. From Mysore general rain is reported; the standing crops are improving, and agricultural operations are in general progress. Water and fodder are available. More rain is reported in parts of Mysore, but the cattle are generally improving in condition. In Coorg the season continues favourable. Good rain is reported throughout the Deccan and Southern Mahratta Country and in parts of Guzerat. In the north of Guzerat more rain is still needed for the crops, which are withering. *Rabi* sowings are going on in several districts. In the Berars the crops are in good condition, except in parts of Akola, where more rain is required. In the Nizam's Territories the recent rain has been beneficial to the crops. In the Central India and Rajpootana States little or no rain fell during the week under report. In Agra and Sehore in the former, and in Marwar, Kherwara, Meywar, Harowti, Jhallawar, and Ulwar in the latter, more rain is much wanted. In the Central Provinces prospects are fair in all districts, except in Nimar and Raipore, where the crops are suffering from want of rain. Preperations for the *rabi* are in progress in some districts. In the Punjab the rainfall of the week was confined to the Ferozepore and Rawalpindi districts, and more rain is wanted in places. *Rabi* operations are in progress in the south-east. In the North-Western Provinces and Oudh slight rain fell in a few districts, but more is required. General prospects are however good. General rain is reported from Bengal. Prospects of the crops are generally good, except on the inundated tracts in the Burdwan and Presidency division, and in Behar. On the Orissa coast crops have been much damaged by the late cyclone. The *bhadoi* crops are yielding fairly where not damaged by floods. In Assam agricultural prospects continue favourable. In British Burmah seasonable weather prevails, and crop prospects are good. The public health is generally fair. Prices are fluctuating in the North-Western Provinces and Oudh and in the Punjab;—in Mysore no material change is reported; while in Bengal the price of rice is falling in some districts. Elsewhere prices are generally steady.

⁂

A CORRESPONDENT of the *Bombay Gazette* says the Horse Show has been opened at Poona. It was very much inferior to its predecessors, and the exhibits were fewer in number and of worse quality than usual, while the yearlings are sadly deficient in those qualities which at one time were characteristic of the annual show in Poona. In the fancy classes the show was poor, very few hunters and teams competing. It was visited by a large number of visitors. His Excellency the Governor and staff were present, and inspected the animals. The Commander-in-Chief distributed the prizes to the owners of the horses. No prizes were awarded to the exhibitors of horses four years and over or to geldings bred in India, but under clause X, a special prize of Rs. 80 was awarded to a horse called *Maulabux*, belonging to Mr. Dadabhoy Hormusjee Dubash. Very few of the exhibited horses are being sold. Thus the Horse Show for 1885 closed.

⁂

THE *Daily Chronicle* of the 8th September has the following paragraph :—"Two singular features in the jute trade are reported. The ship *Falls of Dee*, which arrived in the Tay recently, had on board as part of her cargo 110 bales of jute gunny bags. This is said to be the first direct importation to Dundee of manufactured bags from Calcutta, and the fact that 80 tons of these goods have been sent from India to the head quarters of the jute industry in this country, is considered to be a proof of the keen competition now carried on in the jute trade. It is also reported that a Dundee jute merchant has exported, or is about to export, a quantity of jute to Calcutta, there being at present a scarcity of jute at the Indian port and a glut of it in Dundee, where the price of the article is much lower than it is at Calcutta, its original port."

⁂

MR. BLISS, the Commissioner of Salt and Abkari Revenue, has submitted his report regarding his enquiries into the measures adopted to secure the purity of monopoly salt, according to which there has been a slight improvement in some respects, but in others it has somewhat deteriorated. The Government of Madras, however, think that the quality has in recent years distinctly deteriorated—the average percentage of chloride of sodium, which in 1876 was 93·505, is now only 92·513. They cannot accept the Commissioner's excuse, of addition to the work of the officers of the Department as having anything to do with the deterioration in the quality of monopoly salt. But to aid the Commissioner in this work, it has been decided to place the services of Dr. Rutton at his disposal for six months to enquire and ascertain the cause of the deterioration in the quality of the salt.

⁂

WE noticed a short time back the despatch of a consignment of mahogany seeds from Barbadoes, intended for Madras, but which had been sent all the way to England first, whence they were to be forwarded to Madras: and we remarked at the time that this circuitous mode of obtaining seeds was not calculated to result satisfactorily, as the vitality of the seeds was seriously affected by long keeping, and a double sea voyage. These seeds have now been received in Madras. The Secretary of State, in his forwarding letter, observes that they were ordered directly from Kew instead of through his office as usual. Mr. Lawson, the Director of Cinchona Plantations, Gardens and Parks, Nilgiris, in acknowledging receipt of the seeds says: "Inasmuch as many seeds lose their germinating power very rapidly, it is desirable that they should, in all cases, be imported direct, and not have to go through an intermediary office." This just bears out what we said, and we hope that some means will be found to import seeds from foreign countries for India direct, instead of their having to go all the way to the India Office, thence to the Royal Gardens at Kew, and from there forwarded to India. Red-tapeism might, we think, in the case of seeds, be dispensed with.

⁂

MR. WHYMPER, of the Nilgiri Brewery, offers a good field for the remunerative cultivation of barley in the southern presidency. Having been granted a contract from Government for the supply of malt liquors, the brewery will require large quantities of barley, which the proprietors would prefer to purchase locally, instead of having to import it from the Punjab. It appears that malt costs them Rs. 22-13-4 per quarter, delivered at Ootacamund, which is a very high rate, and they are prepared to buy at any price under Rs. 20 per quarter. Barley of an inferior quality is grown in the Nilgiris, but there is no reason why, when a demand has been created for good grain, a better quality cannot be grown in the Nilgiris. We are glad to learn that the Madras Government, to whom Mr. Whymper applied, are taking steps to make the requirements of the brewery as widely known as possible among the principal cultivators of the district. The Company would purchase about 40,000 bushels annually, which would be equal to about 28,000 maunds. The Madras Government, in passing orders upon the subject, observe that "there is no doubt that the barley at present grown by the Badagas has greatly deteriorated owing to the want of fresh seed, and there is as little doubt that, with this defect supplied, as good a quality of grain might be raised on the soil and in the climate of the Nilgiris as in any part of Asia or Europe. Having in view their large requirements, it is for the Company to consider whether it would not be worth their while to import and distribute seed of good quality amongst the Badagas, who, it is thought, would gladly enter into contracts to supply the demand of the Brewery. If a certain market for the produce were once established, it is probable that cultivation would extend, and the requirements of the Brewery could be met at rates far more reasonable than under the present system of importation.

⁂

THE value of fruit as a diet has often been insisted upon; but there seems to be a sort of prejudice to the use of fruit on a large scale, which may doubtless be traced to an ignorance of the laws of hygiene. The following remarks, which we extract from the *Journal of Health* will, we think, be read with interest. In a hot, enervating climate like that of India, fruit should form a very large proportion of our daily food :—

Of all the fruits with which we are blessed, the peach is the most delicious and digestible. There is nothing more palatable, wholesome, and medicinal than good ripe peaches. It is a mistaken idea that no fruit should be eaten at breakfast. It would be far better if our people would eat less bacon and grease at breakfast, and more fruits. In the morning there is an acrid state of the secretions, and nothing is so well calculated to correct this as cooling, sub-acid fruits, such as peaches, apples, etc. The apple is one of the best of fruits. Baked or stewed apples will generally agree with the most delicate stomach, and are an excellent medicine in many cases. Green or half-ripe apples stewed and sweetened are pleasant to the taste, cooling, nourishing, laxative, far superior, in many cases, to the abominable doses of salts and oil usually given in fever and other diseases. Raw apples stewed are better for constipation than some pills. Oranges are very acceptable to most stomachs, having all the advantages of the acid alluded to, but the orange juice alone should be taken, rejecting the pulp. The same may be said of lemons, pomegranates and all that class. Lemonade is the best drink in fevers, and when thickened with sugar it is better than syrup of squills and other nauseants in many cases of cough. Tomatoes act on the liver and bowels, and are much more pleasant and safe than blue mass. The juice should be used alone, rejecting the skins. The small seeded fruits, such as blackberries, figs, currants and strawberries, may be classed among the best foods and medicines. The sugar in them is nutritious, the acid is cooling and purifying and the seeds are laxative. We would be much the gainers if we would look more to our orchards and gardens for our medicines and less to drug stores. To cure fever or act on the kidneys, no febrifuge or diuretic is superior to water-melon, which may, with very few exceptions, be taken in sickness and in health in almost unlimited quantities, with positive benefit. But in using them, juice should be taken, excluding the pulp, and then the melon should be fresh and ripe.

It is true that we cannot procure apples in sufficient quantities, or at rates low enough to suit the pockets of the masses, but peaches, water-melons, oranges and figs are common enough, and should be largely used. We have other fruits, such as plantains, mangoes, plums, papyas, and pine-apples, custard apples, &c., which are all good, wholesome fruits, which ought to figure conspicuously on our tables. The tomato can be had nearly all the year round, and limes or lemons are plentiful in all seasons.

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MR. REA, of the Archæological Survey, has brought to notice an important archæological discovery he has just made at a place called Narasapalaiyam, in the North Arcot district, which consists of some rock-cut excavations. He thinks that the hitherto received opinion that they are of Jain origin, and probably the ancient residence of monks, is erroneous; and that, judging from the architecture and inscriptions, are more important than had been supposed. He says they are similar in style to the caves at Mahabaliparam, which have been usually considered the most ancient works in Southern India; that the architecture and method of cutting the rock, likewise the letters employed in one of the inscriptions, are the same as the Pallava Grantha characters used at Mahabaliparam. He thinks that they date back somewhere to the 8th century. This is certainly an interesting "find," and we are glad to learn that the excavations have been completely surveyed, and that impressions of the inscriptions have been taken. Mr. Rea says that the impressions and translations of these inscriptions have been despatched to Dr. Burgess, who will doubtless give us the benefit of his knowledge as to the value of this discovery in due course.

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THE report submitted by Mr. Benson, Agricultural Reporter to the Government of Madras, on the working of the Madura Farm, shows that some good work was done there. The soil is said to be very poor and unsatisfactory, but much has been done to improve it. Suitable buildings for stock have been erected, and several large wells sunk, with good results as to water-supply. The present has been a bad season, and so was the last; but notwithstanding these drawbacks, guinea grass was put down on land partially reclaimed, which has done fairly well. Vegetables have also done well, while tobacco has been found to grow well, and some of that produced has been highly thought of. In fact, it presented characteristics which promises that the growth of leaf of good quality is possible. The cattle were all kept in boxes on the accumulated manures, with satisfactory results. It appears that the quantity of manure turned out on this system is very great, and the cost trifling. The cattle were generally doing well. Mr. Benson notices the want of land on which a supply of paddy straw could be raised for bedding. He thinks that certain land which Government declined to take up last year would answer this purpose very well, while it would at the same time present a fair site for carrying out experiments in the use of irrigation water, and the cropping of irrigation crops. This subject is under consideration. There is, apparently, no Superintendent appointed by Government over this farm. This is a want which should be supplied at once, as no good results can possibly be expected without a qualified superintendent. We understand that some men are available in the Agricultural College. Why should not one of these be appointed, instead of the Saidapet Farm overseer?

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LAST week we reproduced a letter addressed by Mr. D. B. Allen to the *Englishman*, regarding the use of bones as manure, which has elicited the following from a correspondent, who signs himself "L. L.,"—and which will be read with interest :—

Mr. D. B. Allen, in your issue of the 6th instant, draws attention to the wholesale exportation of bones from the agricultural districts of India. It is a matter of congratulation to find that one so recently out in this country from the study of agriculture in England, has been struck with at least one of the evils which are undermining the productive powers of the soil in India. The evil against which Mr. Allen has raised his voice has been of longer continuity and of greater dimensions than even he seems to be aware of. I shall give here some figures taken from the Trade and Navigation returns published regularly by the Department of Finance and Commerce of the Government of India, which will show the weight and value of the bones exported during the last five years :—

	Tons.	Rs.
1880-81	7,490	2,15,821
1881-82	6,733	2,41,495
1882-83	10,903	4,19,131
1883-84	26,945	12,91,093
1884-85	18,883	7,87,179

These exports proceed from the different ports in the following proportions (to quote the figures of the last mentioned year) :—

Ports in—	Tons.
Bengal	3,587
Bombay	8,862
Sind	2,287
Madras	3,948
British Burmah	199

And they are consigned chiefly to the United Kingdom, Ceylon, the Straits Settlements, and Hong-Kong. Besides bones, other soil-enriching substances are also exported, and their value amounts annually to over fifty thousand rupees. The export trade in bones has not escaped the attention of the officer (Mr. J. E. O'Conor) of the Department of Finance and Commerce, who compiles and reviews the statistics of the maritime trade of India, for I find that in his Review for 1883-84 he made the following remark :—"There was a large increase in the trade in animal bones, of which 23,000 tons were sent to England, though they might more usefully have been applied to the fertilisation of Indian soil."

In the Review for 1884-85 also he notices the trade, and makes a similar remark. But it is evidently the duty of the Agricultural Departments of the different provinces to bestir themselves in the matter, and to explain the evil to the various native and European associations interested in the welfare of the country and of agriculture in particular. Such associations, if made to understand the evil and to awaken to a sense of their duty, could easily induce land-owners to appreciate the value of bones, and either to prohibit their removal from their estates, or to levy such a rate for right of removal as to make the export an unprofitable enterprise.

That bones make a valuable manure has long been known, and their wholesale exportation from India is a matter for grave consideration. But "L. L.," who we think also hails from the Department of Finance and Commerce, has lost sight of the immense quantities of really valuable manure that are daily "wasted in the desert air" by the Municipality of Calcutta, and which might, with advantage, be more profitably utilized by the ryots and cultivators than bones, of the use of which the Indian cultivator knows little or nothing.

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In December last year the Government of Bombay sanctioned a trial to be made for threshing wheat with a steam threshing machine. The experiment has come to an end, but with what success we are at present unable to say; as, although the Bombay Government have issued a Resolution on the subject, there is no mention made of the *result* of the experiment. Copies of the report submitted by the Director of Agriculture on the result of this trial, are to be forwarded "to all Commissioners, Collectors, and Political Officers attached to Native States, and the Chambers of Commerce at Bombay and Kurachee for information"; but whether the *Indian Agriculturist* is to be favoured with a copy remains to be seen. The Resolution itself which we have cut out from a Bombay contemporary, and after omitting the preamble runs as follows:—

> Messrs. Balmer, Lawrie & Co. should be thanked for the enterprise shown by them in sending the steam wheat thresher fully equipped and manned to this presidency for experimental purposes. The thanks of his Excellency the Governor in Council should also be conveyed to the Chief of Vinchur and Rao Saheb Mahadev Balkrishna, Mamlatdar of Niphad, for the energy and foresight displayed by them in facilitating and furthering the objects of the experiments.
>
> The proposed payment of Rs. 1,250 to Messrs. Balmer, Lawrie & Co., as the Government share of the expenses incurred by them on account of the carriage and working of the machine, is sanctioned.
>
> The Governor in Council is unable to entertain the proposal made by Mr. Ozanne that Government should buy the engine and thresher used last season at a maximum cost of Rs. 4,000 and work them in Khandesh in connection with the Bhadgaon Farm, as there is no budget grant for the purpose, and as it is not an object on which Government can ask the Government of India to sanction expenditure while the veto on all extraordinary outlay is sustained. In the circumstances the best course to adopt is to offer to Messrs. Balmer, Lawrie & Co. to bear half the expenses as proposed of another experiment in Gujerat next season; with the promise to buy one smaller complete machine for the Bhadgaon Farm hereafter, if the new experiment is fairly successful. The Director of Agriculture should be requested to ascertain if the Vincharkar or some Chief in Kathiawar would buy the old machine.

The inference to be drawn from the foregoing is that the Government are *too poor* to purchase the steam thresher at a cost of Rs. 4,000, although it is required to be worked in Khandeish in connection with the Government Farm at Bhadgaon. The reason given for this would seem to be as 'poor' as the Government professes itself to be.

Messrs. Balmer, Lawrie and Co. are to be congratulated upon the spirit of enterprise displayed by them in connection with this experiment, and it is much to be regretted that they should receive so little encouragement at the hands of Government who profess themselves ready and willing to encourage private enterprise, especially in connection with the wheat trade of India.

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In a country like India, abounding as it does in rich stores of archæological and epigraphical interest, the recent Resolution of the Government of India to encourage a closer study of the subjects, cannot fail to be regarded as a move in the right direction. The question has occupied the attention of Government for some time past, but received a powerful impetus in 1882, when the Secretary of State for India, in sanctioning the appointment of Mr. Fleet as Epigraphist to the Government of India, suggested the desirability of training native scholars in such a way as to fit them hereafter for taking a prominent place in the prosecution of historical research. Mr. Fleet, whose opinion was obtained on this suggestion, advised that Professors of Sanskrit in Government Colleges should form classes of selected students for special training in epigraphical and historical researches. He observed that, with such a preliminary training, a few students would be secured who would be fitted to commence under him the more rigid study of critically examining new inscriptions, of translating and editing them, and of disposing of their contents in a scholar-like manner. The local Governments and Administrations consulted on the subject were, however, of opinion that the adoption of Mr. Fleet's suggestion for the formation of such classes in Government Colleges would not be practicable; the reason given being that the time of the Professors was already fully occupied, and it was considered doubtful whether, under present circumstances, students would be forthcoming to attend them. But it was generally agreed that the several Universities might with advantage make Indian palæography an optional subject for the higher degrees, and they are to consider what steps should be taken for attaining this object. We are therefore glad to find that, in order further to encourage the education and training of natives of India in epigraphy, the Governor-General in Council has suggested that a special prize of Rs. 500 should be offered by the local Government annually at each University to the student who does best in this subject if he is recommended for it by the examiners. It is also suggested that this prize might hereafter be supplemented by the liberality of private gentlemen interested in the ancient history of their country, if their attention were invited to the subject. In this respect the Viceroy has set an example by directing that an annual prize of Rs. 500 be offered for the best collection of inscriptions, with a critical essay on them by *bonâ fide* graduates of the Universities under 30 years of age. The essays are to be sent to the Epigraphist to the Government of India on or before the 1st April of each year, and the amount of the prize is to be charged in the contingent bill of the Epigraphist. The selected essay will be printed at the expense of Government. Lastly, in order to encourage the study of epigraphy among the Surveyors and Assistant Surveyors employed in the Archæological Survey Department, the Governor-General in Council has sanctioned the grant of a reward of Rs. 500 to any *employé* of that department who qualifies in epigraphy within two years from the date of his appointment to the department.

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The question of cattle-disease is an important one in India, and too much care cannot be devoted to a clear and proper understanding of the subject. As a matter of fact, little or no attention is paid to the health of cattle, especially such as are intended for the slaughter-yard, and the meat of which adorns our tables later on in the form of tasty dishes cleverly and adroitly done up by the indispensable "baburchi." How much of the meat thus served up may be diseased, and unfit for food, it is difficult to say; but we should imagine, after reading the two articles on tuberculosis in the last number of the *North British Agriculturist*, that a very large percentage of the animals slaughtered for human consumption were affected with this terrible disease. Although, in the letter addressed by "J.H." to the *N.B.A.*, he takes a somewhat moderate view of the extent and effects of tuberculosis, yet he is willing to believe that Professor Walley has good and sufficient reasons for advising the slaughter and burial of all animals in whose system tuberculosis is evidenced by positive symptoms, with compensation to owners. The Professor even goes further, and maintains that even animals in whose system there is strong presumptive evidence of the existence of the disease should be so treated. The leading article in the *North British Agricul-*

turist goes into the subject thoroughly, and puts the matter in plain language, and deals exhaustively with the disease in all its aspects. We have a shrewd suspicion that were a thorough system of investigation adopted in regard to the animals slaughtered in our large presidency towns and cantonment stations, some very startling discoveries would be made. One's blood runs cold to think that we may be taking into our system the germs of this horrible malady at every meal! It would, of course, be a morbid state of mind that would imagine a tubercle in every piece of beef or mutton; but the danger is none the less real for that. It behoves our municipal authorities to be exceptionally careful in passing animals for the slaughter-yard, and in minutely having examined the meat of all animals *after* being slaughtered. The two articles referred to by us will be found among our selections.

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THE American Exhibition of arts, inventions, manufactures, and products, to be held in London next year, in juxta-position to the Indian and Colonial Exhibition, promises to be quite a feature of the age. A correspondent of the *Statesman*, in a recent letter on the subject, says :—

> A matter of gain to India will be the attention that Americans will be likely to give to the capabilities of private enterprise in India. In all that relates to agriculture, and not less in manufactures, there is a vast field offering, hitherto unattempted, and if our American friends will only show the more cautious Britisher the way, it is possible that the wealth of Ormus and of Ind may be found to exist not only in fable. The younger generation of the feudatory princes and noblemen have been educated under European auspices to an understanding of civilisation and enlightenment not comprehended by their fathers. Numbers of them will visit England this next year by special invitation of her Majesty's Government, and if their State coffers are drained of a large amount, the material gain to themselves and their people will be incalculable.

Further on, he gives the following interesting information :—

> In the language of the Exhibition prospectus, it is proposed to arrange the entrance hall so that the European visitor shall take leave of his native soil, and shall temporarily be in and commence his visit to North America from the harbour of New York, with the Bartholdi Statue of Liberty, and the striking features of the Eastern entry to the United States around him. On leaving "New York Harbour," the visitor's first excursion will be through the various States across the Continent to San Francisco, from the Atlantic to the Pacific sea-boards. He will have the opportunity of inspecting collections, illustrating the wealth and civilisation of the entire country from east to west, from north to south. The railway routes and the picturesquely diversified scenery of the agricultural, pastoral, forest, and mining States will be illustrated by paintings, plans, and products. The natural resources and characteristic social conditions of the various parts of the vast territory extending from ocean to ocean, and from the lakes to the gulf of Mexico, will thus be exposed to view, and will offer exceptional facilities for comparison. The condition of the respective agricultural, grazing, mineral, and manufacturing localities will be particularly shown, and in a manner which will be intelligible and interesting to all; whilst the state of development and the undeveloped resources of the various sections will be brought under the visitor's notice in such a form as will enable him to establish a trustworthy basis for judgment as to their respective advantages. It is intended that this shall be one of the most valuable, instructive, and entertaining features of the Exhibition. The manufacturing department of the Exhibition will comprise the development in every branch of that inventive genius which in the United States has reached so high a point; and so far as possible, it is proposed to present the various processes in working order by the aid of electricity, steam, gas, or hydraulic power. A separate hall (the Industrial Hall) will be devoted to the handicrafts pursued by white, Chinese, Indian, and negro men and girls. The labour-saving machinery, by which manual labour is reduced to a minimum, will be plentifully exhibited. The systems of working the great railways and canals, the oil wells, and the coal and silver mines will be shown, together with the machinery and organisation by which American manufactures are produced. Not only sight-seers, but manufacturers, land-owners, commercial men, farmers, all who are interested in stock-raising, and all who think of emigration, will find much to study in the Exhibition.

IN addition to the above, and various forms of amusement and recreation to be provided, the following comprehensive programme is presented to the public :—

> The Exhibition will include a Californian wine-shop; Florida fruit store; an Indian village; Indian canoe-makers and mat-weavers: ice drink pavilions and bars. Restaurants, with the products of the Eastern and Pacific coasts, of the Northern and the Southern States, characteristically prepared and served by white and coloured male and female cooks and waiters, will help to mark the peculiarities and variety of American social development. Arrangements are being made to include a Press Pavilion; an Atlantic Cable office; an Electrical Elevated Railway, and reproductions of the façades and interiors of remarkable hotels and public buildings. The lighting of the buildings and the illumination of the grounds, avenues, gardens and fountains by electricity, are already having the most careful attention of the council, and will in themselves constitute an especially interesting and attractive display. Finally, a feature of the Exhibition will be the manner in which the grounds will be laid out with a wealth of American flora; intersected with cool and shady avenues with seats everywhere, in sound of good music and the playing of fountains; and illuminated at night,—a fairy scene.

It, is therefore, evident that the Americans know how to go about these matters. And when it is said that the entire Exhibition is a purely private undertaking, the United States Government providing no funds, we may well admire the indomitable enterprise of our trans-Atlantic cousins.

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AN interesting lecture was delivered by Colonel Hunt, C.B., Commissary-General, at Simla on the 2nd instant, on the subject of Stock farming in India. A full text of the lecture will be found among our selections. We quote below an important portion of the address, from which it will be evident that Colonel Hunt knows what he is talking about :—

> From the cattle slaughtered for ration purposes the average outturn of ration meat is 143¾ lbs. per head, and that of the sheep amounts to only 21½ lbs. These figures represent about one-fourth in each case of the average weight per carcass in England. Indeed, I may go further as regards mutton, and say that an English leg of mutton weighs often as much as the average whole sheep in India. As a rule the best of the slaughter stock comes into the hands of Government, so the average weight per carcass throughout the country must fall far below the figures I have named. This would not signify if the quality of the meat were good. But I am forced to confess that it is very indifferent. The orders on the subject are that the troops shall be supplied with the best grass-fed beef and mutton. But in a country where for half the year the grazing is of the most miserable description, and where no attempt is made to store and preserve for stall-feeding purposes the immense surplus of fodder produced during the other half of the year, and no attempt is also made at breeding and rearing for the purpose, it is clear that "bad must be the best of it." I have said that improvement in stock must follow improvement in fodder, but so bountiful is nature in the wonderful vegetation which starts every year with the fertilising monsoon, that I think I may qualify this opinion and say that, starting with that period and storing the natural growth of hay, it is feasible to any one possessing grazing land to start the improvement in both matters simultaneously.
>
> In England it is not beneath the dignity of noblemen to purchase young stock every year and turn it into their park land, reselling it with great profit the next year, and in the interim going to but trifling expense in supplementing the grazing.
>
> In India the conditions are different, and such results would by no means follow turning stock into grazing land, and allowing it to feed for itself. But if part of the land were set apart for hay making, *and ensilage were resorted to in the early part of the monsoon*, the system would be just as practicable and profitable in this country.—[The italics are ours.—ED., *I. A.*]
>
> My personal experience as an Executive Commissariat Officer was that, during the dry season, of the cattle and sheep brought for sale, I used to have to reject a large proportion, and I have constantly had the dealers, who are not in this country graziers, offer to sell me the rejected animals at half price or even less. In the case of sheep I have frequently been obliged to reject entire droves, not finding any of them fit for my purpose, and in regard to both sheep and cattle, I have no hesitation in saying that any person possessing or renting a tract of grass land within twenty or thirty miles of any of our large Cantonments, could, by

purchasing stock during the dry months, allowing them to graze all over his ground for the first few weeks of the monsoon, and then reserving a certain portion of his land for grazing and collecting hay from the rest of it, laying out a small sum in the purchase of "kirbee," and cultivating a few fields of lucerne, carrots, &c., could start operations with the monsoon, and turn out his cattle and sheep in prime order after a few months, increasing their weight very much and giving us a vastly superior quality of beef and mutton. An enterprising person devoting his attention to this matter could, by selection from the ewes passing through his hands, start a small flock of sheep to be gradually increased, to breed from; I could give him good rams obtained by crossing with the best English and Australian sheep at the Hissar Farm, and I think I could guarantee that the wool alone would pay the expenses of the flock. I should also be very glad to contract with him to purchase his live stock by estimated weight for ration purposes, and he would commence to recoup his outlay within the first three or four months. His expenditure in farm buildings, cattle enclosures, &c., would be but small, if conducted on the principle which I am now introducing at the Hissar Farm, where we find our object best answered by using light thatches supported on a few poles; and enclosures made by cutting and collecting the "jowassa," or camel thorn (the dry leaves of which by the way shaken in a heap on the ground afford an excellent description of bhoosa for sheep), and rolling it into hedges to form the enclosures.

EFFECTS OF SOIL AND CULTIVATION ON THE COLOUR OF WHEAT.

At the present time, when the question of improving and extending the cultivation of Indian wheat is attracting such a large share of attention, it is satisfactory to find that the Government of India is interesting itself to get together all the information possible on a very important subject in connection with wheat cultivation, *viz.*, as to whether the quality of the soil or the character of the cultivation effects a change in the *colour* of wheat. From the correspondence placed at our disposal by the Revenue and Agricultural Department of the Government of India, it appears that in June, 1884, enquiries were set on foot with a view to determining this point. Replies have been received from the several Local Governments, which tend in a measure to prove that soil and cultivation *do* change the colour of wheat.

Mr. Ozanne, the Director of Agriculture, Bombay, says that he has not instituted enquiries in this direction before, but he is arranging for a thorough and systematic test of the questions whether red wheat will turn to white, and *vice versa*, under the influences of soil and climate; and whether hard wheat will become soft, and soft hard, under similar conditions. He quotes two works on farm crops wherein it is stated that the colour of wheat is influenced in some measure by both soil and climate. The following paragraph, quoted by Mr. Ozanne from Wilson's *Our Farm Crops*, throws some light on the subject:—

> "The difference in colour between the red and white varieties is probably mainly due to the nature and character of the soil in which they are grown. Fine white wheats gradually become darker and coarser when grown continuously on cold uncongenial soils, while the coarser red wheats grown, year after year, on rich warm soils in a good climate, generally lose their characteristics, become of a lighter red colour, then yellowish, and finally assume the external appearance of a strong white variety. It has been remarked that the grain in this respect is affected differently to the straw in changing its colour and character more quickly than that does. Hence we have many varieties of red wheats with white chaff and straw, and varieties of white wheats with red straw, the chaff and straw retaining their original colour after the influence of cultivation has effected a change in the grain."

He also quotes Dr. Forbes Watson, who thinks that the marked geographical distribution of the various wheats of India seems to show that the influences of climate on colour and hardness is considerable. As to the effects of excessive and late rainfalls, Mr. Ozanne says that he has sufficient evidence to prove that these tend to make hard wheat become more or less soft, and instances some cases where this actually happened.

The Director of Agriculture and Commerce, N.-W. Provinces and Oudh, has reported that hand-picked white wheat was sent to certain district officers for experiment, one of whom has submitted a decisive report to the effect that five specimens were sown in the stiff clays of Muskara and Hamirpore, and that in every instance the produce was very much redder in colour than the parent seed. This is very conclusive proof that soil exercises great influence in changing the colour of wheat. Another instance is mentioned of a field of clayey soil close to the Cawnpore Agricultural Station being sown with hand-picked white wheat, the produce of which on being threshed was found to be inferior in appearance and colour to the original seed. The Director of Agriculture thinks that this effect is probably due to the presence of iron salts in which clayey soils are generally very rich. He observes, however, that the fact of white wheat in certain soils reverting to red in colour, is a matter of common knowledge in most districts; and that it is alluded to as an agricultural fact in Sir John Le Cantuer's book on *The Improvement of Wheat Seed by Observation and Selection.*

The report received from the Punjab is a little conflicting. It is stated that all the replies received from the various district officers consulted, do not throw much light on the subject; that the question appears to have been a new one to most farmers consulted by them; and that replies from many districts were to the effect that changes from white to red, or *vice versa*, were unknown. It is, however, stated that a good white wheat, if cultivated without care, and under conditions of soil, irrigation, &c., unsuitable to it, will by degrees degenerate into a red wheat; but that scarcely any instances were known of the improvement of a red wheat to a white by superior husbandry. It seems to us that the enquiries instituted in the Punjab on this subject were not of a nature to elicit satisfactory answers. It is apparent that no *practical tests* were applied to ascertain facts beyond doubt, as was the case in the N.-W. Provinces and Oudh. The answers returned by the several district officers appear to be founded on hearsay evidence of native agriculturists, who cannot be expected to make accurate statements on a point requiring close observation, and experiment, and which entails some little trouble. But an impetus having recently been given to the wheat question in the Punjab by Sir Charles Aitchison, in his important resolution noticed in these columns a short time back, it will no doubt act as an incentive to more accurate enquiries into the subject under reference.

Equally unsatisfactory is the report of the Director of Agriculture, Central Provinces. He gives it as his opinion that he could discover no grounds whatever for believing that the colour and variety of wheat was altered by a change of soil or climate; and yet he says:—

> The wheat grown in Chattisgurh mostly belongs to one of two well-marked varieties called respectively *hansa* and *kathia*. The former has a soft white grain resembling that of the *pissi* kind; the latter has a hard red grain. *Hansa* wheat is grown on deep black soil retentive of much moisture. *Kathia* wheat is grown on land in which yellow clay is mixed with black earth and which dries up comparatively soon. Their cultivation is, therefore, markedly localised. *Hansa* predominates along the western border of Chattisgurh where deep black soil abounds, and *kathia* is principally grown over the rest of the area where the soil is shallow.

It will be seen from the above that it is clearly the *soil* that affects the colour of the grain. Having got "mixed" *so* far, the Director makes another anomalous statement by observing that he "could find no grounds whatever for believing that the colour of real *kathia* could be changed to white, or the colour of white *hansa* to red, by growing either of them on land best suited to the other."

It appears to us to be evident that the Director took no practical steps to ascertain facts by actual experiments; and, therefore, his report must be regarded as being founded upon mere supposition and belief, instead of upon ascertained facts. He concludes thus:—

> I should add, however, that I have had no opportunity of making enquiry respecting irrigated wheat, and it is, I believe, irrigation which is supposed in some places to effect a change of colour in wheat grain.

The supposition here referred to has no basis whatever, and we are constrained to remark that the report submitted by the *Director* is not what might have been expected from an officer of Mr. Fuller's standing and experience in agricultural matters.

It will be seen from what we have said that the only province where anything like a practical test was applied to ascertain whether soil and cultivation influence the colouring of wheat, was the N.-W. Provinces and Oudh; and these tests prove clearly that the influence is real. We may therefore accept it as an ascertained fact that soil and cultivation tend in a marked to degree change white wheat into red under certain conditions; but the question whether red wheat can be changed into white under similar conditions has yet to be proved; and it is, we presume, with a view to ascertaining *this* fact that the Government of India took up the enquiry. It is a pity, we think, that proper experiments should not have been conducted in this direction. Even the N.-W. Provinces and Oudh Government have omitted to ascertain whether red wheat can be changed into white by superior cultivation, and with different soil to that used in the experiments in the Hamirpore district.

Madras not being a wheat-growing country, we presume nothing was done there in this connection. Bengal, likewise, is not a wheat-growing country, cultivation being confined to certain limited areas, such as the Patna, Bhagulpore, and Shahabad districts. But the results of experiments, even in these districts, would have been none the less interesting. Mr. Finucane has doubtless instituted enquiries, the results of which will, we suppose, be made public in good time.

TANNER'S CASSIA.

Nearly all plants yield tannin more or less, and the species that do so for economic purposes are innumerable. The mangrove, which fringes most tropical coast lines, has been turned to good account in this respect by the Chinese; and as regards India, we might mention that that variety of the *Cassia* known botanically as the *Auriculata*, a common shrub in Central and Southern India—more especially on the Coromandel coast—is extensively used for tanning purposes in those parts of the peninsula where it is indigenous. The southern parts of the Bellary district and all over the Mysore country in the Madras presidency are the localities in which the plant grows wild, and where its collection forms an industrial occupation for a small section of the local population. The plant is bushy, and from four to eight feet high, in flower all the year round. The *leaves*, according to Roxburgh, are scattered, from eight to twelve paired, and the *leaflets* "oblong, entire, mucronate, a little downy." The *flowers* are "large, numerous, bright yellow," while the *legumes* are "linear, membraneous, waved, from ten to twelve-seeded." The same authority states that the bark is "a pretty strong, simple astringent," while another declares it to be "one of the most valuable tanning substances of India." With this bark the natives commonly tan and dye their leather, and it is said to occupy in this country the same position that oak-bark does in Europe. The plant being quick-growing, is sufficiently large in a couple of years for cutting down, which operation does not necessarily imply destruction, but rather an increase of the number of shoots and a more prolific fresh growth. The *modus operandi* of barking is very simple. The twigs are lopped off, cut into convenient lengths, and dried. The practice in the Mysore country and other parts of Southern India to effect the separation of the bark, is by "beating" with a mallet, on a wooden block, which readily loosens the outer rind or covering, the shells being afterwards bagged for the market. The price at Bangalore is from Rs. 60 to 70 per ton, rough bark; and better prices might be reasonably expected from the product if a little care and attention were bestowed upon its manufacture. The plant will grow anywhere, within its habitat; and, in its wild state, propagates fast. It is a feature in some of the treeless tracts of the Madras presidency, thriving in every variety of soil. The point, therefore, to be considered is—why this useful plant, so common and well-known, has not been utilised to a greater extent ere this?

Miscellaneous Items.

The Cawnpore market report for the past fortnight is a blank. Business is slack and depressed in almost every kind of country produce.

A Kurnool correspondent writes on the 5th instant:—"We have had heavy rains in this district during the past week. There is no fear of famine now, and the crops are progressing favourably."

Arrangements have been made to send from the Central Museum, Madras, for a couple of months in the cold season, a man accustomed to collect and preserve specimens of natural history, and the fruits of his labor will be sent to the Museum to be worked out and named.

A Lucknow paper says:—Somewhat unexpectedly, although for the past day or two the weather has been gloomy, on Thursday a fair quantity of rain fell,—just such showers as are most likely to benefit agriculture. The heat has sensibly decreased as a direct result, and now we may look for an early advent of the cold season. The public health continues fairly satisfactory.

The Poona Horse Show opened on Wednesday at 5 P.M., and remained open the next day, Thursday. There were fancy classes, the prizes in which depend entirely on public subscriptions, while in the *bonâ fide* breeders' classes no entrance fees were charged. There were twelve classes in the former and eleven in the latter, and a very large number of prizes were offered. H. E. the Commander-in-Chief was to distribute the prizes on the 8th.

In Berar good seasonable showers of rain have fallen for the *kharif* crops. Cholera, in a mild form, is still prevalent in some districts. Although sufficient rain has fallen (41 inches) up to date in Nagpore, yet the quantity is 12 inches below the fall of last year for the same period. Timely showers of rain have fallen in the Ahmednugger district to save the crops. Last month a dearth was anticipated, but fortunately it has been averted. Secunderabad is also fortunate in getting 31 inches of rain to date.

A correspondent of the *Ceylon Observer* writes:—"On Sunday, the 13th, at about 2.45 P.M., there was a drizzling of yellow rain spots at Kotahena: the spots were on the leaves, and persons who went out with white dresses at this time and who were caught in this rain found their clothes covered with yellow spots. This is a phenomenon not uncommon in Ceylon, and known as 'blood rain,' the colour of the drops being often red, owing to a fungus, or to dust in the upper atmosphere."

By instructions received from the Minister of Marine in Paris, the Newcastle coal in lumps housed in the temporary sheds on the north beach at Pondicherry is to be sold by public auction on the 30th instant. The quantity to be offered is 4,712 tons which will be put up in eight separate lots and the highest bidder will in each case be the purchaser. It would appear from this action of the French authorities that peace with China is considered permanent, at least for a year or two. The new sheds on the south beach are filled with patent fuel which the French navy engineers prefer to ordinary coal.

A contemporary says:—"Some seven or eight years ago, a number of bees settled in the upper verandah of the Madras Bank, at Bangalore, and constructed two large hives, which hung to the eaves of the verandah. They were very peaceful, orderly neighbours for some time, but one unlucky day, they were accidentally disturbed in some manner, and wreaked their vengeance on every living thing that came in their way. The Bank doors had to be barricaded, as well as the Agent's private quarters, and the utmost confusion and consternation prevailed. A valuable horse belonging to a gentleman who called at the Bank was so fearfully stung, that it shortly after died. Other animals and several persons were more or less badly stung. The bees were after this, of course, dislodged, and not encouraged to settle at the Bank again. A few days ago, however, a large body of them put in an appearance at the Bank, and constructed no less than five hives in no time. Such dangerous neighbours, not being welcome, from past experience, the interesting colony was smoked out, advantage being taken of the fact of its being Sunday, and the Bank closed.

THE recent heavy rains have, it is reported, done considerable damage to property in the Alta Petta of the Kolhapore district. The small stream at Mouza Mahusudi overflowed its banks, and the current carried away the house of a carpenter with all the property it contained. It appears that the carpenter, his wife, and two children were sleeping in a room in the house. In the middle of the night, he was roused by the heavy downpour which descended in torrents. On looking out he found that his house was encircled by the flood. He therefore let loose his cattle and leaving his house to the mercy of the rains, found protection for himself, his wife, and children in another part of the village.

THE Indian trade returns for the month of August, which have just been published, show a slight revival in the import trade, which had fallen off in July; coupled with a decrease in the value of Indian exports which, in July, had shown an increase. There was a large increase in the value of cotton piece-goods imported. In August, 1884, India imported less than two crores worth of cotton piece goods; whereas, for last August, the value exceeded 2½ crores. It may be noted that this increase is entirely due to large imports into Bengal and Burmah, the imports to Bombay, Scinde and Madras showing a considerable falling off. Turning to exports, we find a large decrease under the following heads:—rice, tea, raw cotton, seeds indigo, and other dye stuffs.

AT the last sitting of the Abkari Commission Mr. P. M. Mehta, in resuming his address, dwelt upon the grievances of the bhundaris, who were suddenly thrown out of occupation owing to the tax on toddy trees being doubled at a bound. The bhundaris had taken such an extreme step because they knew that, with the excessive tree-tax that was demanded from them, they could only work at a heavy loss. It was a hardship to the bhundaris to be deprived of their only means of subsistence, and also a hardship to the poor that they should be deprived of a wholesome drink which was generally used by them as food. Mr. Maneckshaw J. Talyarkhan, who also addressed a few remarks to the Commission, urged that the tax should be considerably reduced and brought within reasonable limits, so that pure toddy could be had by the poor for two or three pice per bottle. The president, Mr. Grant, said the Commission would carefully consider the evidence, as well as the addresses to which they had listened, and then submit their report to Government.

THE Mauritius Government recently, in acknowledging the receipt of a letter from the Madras Government, asking that working models or specimens of the 'Casse-tete' and 'Gratteuse' used in Mauritius for the extraction of aloe fibre might, if possible, be despatched to Madras, have replied as follows:—"I beg to transmit to you the enclosed copies of the reports, from which you will see that the machines mentioned in Mr. de Chazal's pamphlet are the same that were used on the estates where the accidents alluded to in Mr. O'Connor's report occurred, and that they are considered inefficient. Some improvements have been made rendering their use safer, but they are still considered as machines requiring caution in their use. The feeding of these machines is reported to be dangerous, although a guard has been devised to prevent the operator's hand from coming into contact with the 'gratte' as it revolves. But this has not quite attained its object." The Government of Madras have decided that "in view of the existing imperfections pointed out in the letter read above in the various machines used for the experimental extraction of the aloe fibre, the Government of Mauritius will be informed that no specimens or models will at present be required by this Government."

MR. ARTHUR P. SMITH, Assistant, Travancore Survey, writes to *Madras Mail*:—"I am credibly informed that some two years ago, it would seem, a Shanar ryot of the village of Kamachipuram, some miles from the postal village of Chinnamanur, in the Periyaculam Taluq of the Madura district, while sinking a well in his land, struck rock, which was blasted with gun-powder at the depth of 23 feet (or 19 molams). Immediately below this rock was found a supposed human skeleton of gigantic proportions. It strikes me as somewhat extraordinary that a human skeleton of such large proportions (however exaggerated, an eyewitness states it to be the remains of an ordinary man) was found beneath solid rock which required blasting. The bones reposed on a bed of fine sand, and I believe are still to be found in the village. Perhaps the bones may belong to some animal other than man, and this accounts for the largeness of size. I may here state that the village lies in an open and arid plain, where wild animals of any size could not have existed for ages. I give the information for what it is worth, as it may be of interest to antiquarians and geologists. Unfortunately I have had no time to devote to the matter, and hope that some inquiry may be made regarding it. My informant was the native school-master of Comobay village, only four miles from the spot."

Selections.

MEETING OF THE INDIAN TEA ASSOCIATION.

A MEETING of the members of the Indian Tea Association was held at the rooms of the Bengal Chamber of Commerce on the 8th instant at 3 P.M., for the purpose of taking into consideration and adopting the new rules for the payment of bonus to coolies. There were present—Mr. D Cruickshank (in the chair), Mr. Geo. Henderson, Mr. W. O. Bell-Irving, Mr. Jas Milne, Mr. G. M. Reilly, Mr. J. Horney, Mr. William Wilson, Mr. G. E. Watson, Mr. C. C. Macleod, Mr. J. C. E. Johnstone, Mr. W. Davidson, Mr. H. C. Garth, Mr. J. N. Stuart, and Mr. C. T. Richardson.

The Chairman opened the proceedings by saying that he thought it was to be regretted that Mr. Wilson, who had taken so much interest in this matter, should have been unable to attend and preside at the meeting. Fortunately, the bonus question had already been fully discussed, and he did not think there was very much to be said in connexion with these rules, which seemed to be generally approved of. It would be in the recollection of the members of the Association that at the general meeting held in February last, certain revised bonus rules were approved of, and ordered to be submitted to the different local associations and to members of the Association for an expression of opinion regarding them, in view of their confirmation and adoption at a later stage. These rules, the object of which was to reduce all round the rates of bonus paid to coolies, were considered desirable in view of the depressed state of the tea industry, and the necessity for making further reductions in expenditure. The rules had been circulated, and the association had received opinions regarding them from local bodies, and also from the home representatives of different companies. There was a considerable conflict of opinion in regard to the rules, the object of which, as stated, was a general reduction of bonus all round, and many were of opinion that they could not be carried out. Some said they could not risk the possible loss of labour by agreeing to them; others that if the rules were enforced, they would be obliged to withdraw from the Association as they could not see how they could be worked. In view of this conflict of opinion, the Committee came to the conclusion that it would be impossible to enforce rules compelling a general reduction of bonus, and they accordingly decided to modify their original proposals, and the revised rules, which had now been circulated for some weeks past, were drawn up. These are based on a different principle from those approved of at the General Meeting in February, and carried out the same principle that was embodied in the original bonus rules. That principle was that the Association would not attempt to interfere between an employer and his own labourers as regards the term on which the latter might be re-engaged. The rules now in force were only intended to regulate the rates of bonus and the wages to be given to coolies leaving one garden of the Association to take employment in another belonging to it, an employer re-engaging his own labourers being free to make any terms he pleased with them. The same principle had been adhered to in the bonus rules which had now come up for consideration. It would be seen that in the original bonus rules, those which had been in operation for some time past, Rule 2 ran as follows:—

"That the maximum rates of bonus or advance to be given to coolies engaged by one garden from another belonging to the Association, shall be (except for gardens in whose favour owing to their situation and other circumstances, the General Committee may consider it desirable to relax the rule) Rs. 6 (per annum) for men, Rs. 4 (per annum) for women, and proportionate rates for children, without any increase of wages; or a corresponding increase in the monthly wages may be given in lieu of bonus or advance.

As regarded coolies re-engaged on gardens on which they had been employed heretofore, the Association had laid down no rule. A manager may make his own terms with the coolies he had imported, and who had been working under him. There had been a good deal of misunderstanding, he thought, with regard to these rules, as several correspondents had referred to them as if they understood them to apply to all coolies alike, and not alone to those engaged by one garden from another. For instance, the Planters' Stores Company write in a letter just received:—

"As I shall be unable to be present at the meeting called for to-day to consider the coolie bonus question, I beg to inform you that the undernoted gardens (Doom Dooma Tea Co., Ld., Samdang Tea Co., Ld. Wilton Tea Co., Ld., Balijan Tea Co., Ld., Digloy Tea Co., Ld.,) do not at present see their way to agree to stop giving the coolies the customary bonus, and are unanimous in their conviction that such a determination would tend to drive their labour, not merely from garden to garden, but from the district altogether, and we will consequently be unable to subscribe to any such resolution. They are, of course, willing to continue not to take labour from neighbouring gardens, and might, perhaps, see their way to gradually, and by a small amount at a time, reduce the rate of bonus; but even then the popularity of some of the gardens would make it very difficult, if not impossible, to fix any equal and definite rate. Further than this, they are convinced it would be most hazardous and unwise to venture."

It appeared from this that the rules had been altogether misunderstood. The companies mentioned were willing to continue not to take labour from a neighbouring garden, and that was what the Association wanted. The rules were intended to discourage coolies going from one garden to another, leaving individual employers at liberty to make their own terms with their own coolies. He had not heard any grave objections to the rules as at present drafted. They would find that in the revised bonus rules, now under consideration, it is stated: "That no bonus or perquisite, such as rum, rice, blankets, &c., shall in future be given to coolies engaged by one garden from another belonging to the Association." That was to say, the object of the original rule was to reduce the rates of bonus from the higher rates, previously ruling, to an uniform rate of Rs. 6 to a man and Rs. 4 to a woman. The object of the present rules was to do away with bonuses altogether in the case of coolies engaged by one garden from another. But as many engagements were made under Act XIII., it was necessary to provide for advances to be given for agreements under that Act, in order to make them binding, and accordingly the rule went on to say: "In cases where agreements are made with such coolies under Act XIII of 1859, and it becomes necessary to make an advance in order to bring these agreements within the provisions of that Act, the amount of advance for a year's agreement shall not exceed Rs. 6 for a man and Rs. 4 for a woman, and shall be recovered by equal monthly instalments during the last six months of its currency." The principle of giving no bonus was here adhered to, the amount given under Act XIII as an advance being recovered during the last six months of the agreement. It would be seen, therefore, that the new rules went a step further than the original rules. The time allowed in which to receive opinions regarding the proposed rules was rather limited, but this was unavoidable as they wanted to get the rules adopted and passed during this month, in order that they might be in operation from November. So far as the answers he had seen went, no serious objection had been taken to the rules, and the discussion regarding them had already done much good, and had led to considerable reductions being made in the rates of bonus both in Assam and Cachar. He would be glad to hear what any gentleman had to say in reference to them, or any objections there might be to bring forward.

Mr. Stuart remarked that the only reply he had received from Assam showed that one of the managers of a garden there had misunderstood the rules in the same way as the Planters' Stores Company.

Mr. Henderson said that his firm had one objection to rule 5, and that was, that the time should be extended to six months instead of three as at present. In some districts twelve months were allowed.

The Chairman said that there was no reason why District Committees could not make it twelve months if they chose making it a local rule.

Mr. Henderson said that one or two men had written down, stating that they thought rule 4 invalid and quite useless.

The Chairman pointed out that under the Act a coolie was entitled to his discharge note.

Mr. Henderson was of opinion that coolies did not want it, and that the possession of one debarred him from employment anywhere else.

Mr. Stuart enquired whether a manager under the Act was bound to give a discharge note.

The Chairman thought he was.

Mr. Richardson remarked that any coolie could go to a garden not in the Association, where he would be received with open arms.

Mr. Stuart said that the special object of rule 5 was to prevent coolies going from one garden to another.

The Chairman did not think the rule relating to discharge notes a very clear one, but the object of rule 5 was to discourage coolies changing from one garden to another.

Mr. Stuart thought it advisable to adjourn the meeting for the purpose of obtaining further opinions on the rules.

The Chairman said that he had received a telegram from the Secretary of the Cachar District Committee to the following effect:—

Meeting, Cachar Committee, 3rd October. Bonus Rules.—Rule 2. Alter last two lines thus "recovered during the currency of the agreement." Rule 3. Insert words "rate of" between monthly and wages. Rule 5 agreed to by 5 votes against 4.

He did think it would be a great pity to pass the rules without carrying with them all the local bodies. The original rule 5 was not so strict. At the meeting held in February last the rule (5) was submitted, and the Chairman said:—

"The next rule was a modification of the Jorehat proposal, and was as follows:—

"That no superintendent, manager, assistant manager, or other employé or agent of a garden represented in the Association shall, without the consent of the labourer's previous employer, employ or harbour any labourer from another garden also belonging to it, until a period of six months shall have elapsed from the time of the labourer leaving the garden on which he was last employed."

It seemed from the agreement of the Jorehat planters, which had been circulated, that it was almost the unanimous opinion that some such rule should be in force, but it had been considered better to modify the period of one year to six months."

The resolution was voted, and since then, owing to differences of opinion as regarded the rule, it has been further modified and limited to three months. A similar rule had been in operation for some time in several districts, he believed, being a local rule.

Mr. Henderson did not see how the Association gardens would suffer from the rules. They ought all to gain.

After some further conversation,

The Chairman remarked that it had been suggested that as they had received only one report from one local committee on the revised rules, and as the time had been very limited for obtaining the views of the various local committees, it would be advisable to adjourn the meeting for a month until reports came in from Assam and Sylhet. This view met with general approval, and the following resolution was put and carried unanimously:—

"That this Meeting be adjourned to the 12th November next to admit of reports being received from those Local Committees who have not yet submitted their views regarding the proposed new bonus rules."

This resolution having been carried, the meeting separated after a vote of thanks to the chair.

STOCK FARMING IN INDIA.

THE following is the text of the lecture delivered at Simla on Friday last, the 2nd instant, by Colonel J. Hunt, C.B., Commissary General, upon the above subject:—

The subject of my lecture is Stock Farming in India, as connected with hay and other fodder farming. My object in delivering this lecture is of a two-fold nature: 1st. The strictly professional motive of improving the economy and quality of the English Soldier's meat ration. 2nd. The advancement and prosperity of her Majesty's Indian Empire, in the improvement of the stock of sheep, cattle, and horses, &c., and in the consequent improvement in the trade in wool and hides, as well as in that of food supply. The subject is very closely connected with the agricultural interest of the country in regard to hay farming, a matter which, in proportion to the rapid extension of cultivation of food grains and of crops utilised in production of clothing, &c., is daily forcing itself upon the notice of the public and of Government with increased urgency; and in regard to which I must preface my discourse with some remarks to enable you to appreciate the force of the facts which I purpose laying before you. It is now some two or three years only since the difficulty in procuring forage for the mounted branches of the Service, and at the same time dealing fairly with the interests of the ryots and landholders in protecting their land from the ravages of the grass-cutter, has induced the Government to inaugurate a system of preserving Cantonment lands for production of hay, and of starting grass farms in the neighbourhood of large Cantonments where the fodder difficulty was particularly apparent. The officials employed on this duty have found it somewhat uphill work, and work of an unpopular nature, owing to the necessary uprooting of time-honoured customs and institutions which formed some of the items of the easy-going life so acceptable to the European constitution in the, to it, trying climate of India. But very material and important results have been attained, which may be summed up in the fact that it has been demonstrated that here, as in England, to utilise meadow land for hay-making instead of reserving it entirely for grazing, is a most profitable procedure; and that, so far from grazing land being injured by taking an annual crop of hay off it, it is improved; and while the prospects of the hay crop are by no means damaged by grazing off the first growth of grass which springs up with such rapidity when the monsoon sets in, there is good grazing also to be had from the after growth when the hay has been removed.

We have in our Indian Stud and other farming operations, long since realised the fact that grass land will not, as grazing land, support cattle throughout the year, and that to obtain the full value from such land resort must be had to hay-making; and we have also proved that excellent hay, which will retain its nourishing properties unimpaired for years, is obtainable from properly protected land all over the country. The value of the experiments carried out within the last two or three years consists largely in this knowledge having been disseminated through the country to our Cantonments, from whence it will spread rapidly to the zemindars and ryots; and when they realise that properly cured hay finds a ready market, and that it is the determination of Government to preserve to them their lands from trespass of any kind, and further that it is greatly to their interest to raise hay with the object of breeding superior cattle, sheep and horses, I have no doubt that the fodder difficulty will quickly become a thing of the past, and I confidently expect that in a very few years hay will be abundantly procurable, not only at every Cantonment in India, but in every halting place throughout the country. Officers like Sir H. Macpherson have done the State most valuable service in the interest displayed in this question of grass supply and their personal exertions to further it, but I do not go with them in their ideas of the necessity of ploughing and top-soiling to raise hay in India where the heavy rainfall of the monsoon of itself sufficiently loosens the soil and fertilises it. The gutta banda system under which the Indian agriculturist divides his field into a number of small squares marked out by a slight elevation of the soil a few inches high, answers every purpose when the rainfall would not otherwise lay long enough to penetrate and loosen the soil. As for manuring and top-soiling it is quite needless. The concentrated rainfall which we have in the monsoon does this work by flooding the country, and depositing, wherever nature or art has provided the means of regulating it, *i.e.*, nature by depressions in the plains, or art by something in the gutta banda line, ample manure, washed from places where the water cannot lie. Ploughing and topsoiling produce rank vegetation and render it too expensive to contend with weeds and injurious herbage. I can point to many places where grand hay is collected after every monsoon from ground where the water is thus naturally detained for a while annually, and where never a hand's turn has been done since creation in the way of ploughing, top-soiling, or manuring. The Indian Forest Officer will tell you how by the simple process of fencing in ground for arboriculture, and in the interests of the growth of trees preventing the grass from being grazed down throughout the year, the hay crop has been increased where such operations are carried on, seven fold.

The experience of the last year or two leads me to most strongly deprecate, not only ploughing and manuring, but cultivation of any thing but hay proper; and I think that the time has come to regulate the energy of certain of our enthusiasts whose ambition, not content with increasing the Cantonment income by the cultivation of various crops which they consider more profitable than hay, does not stop quite short of raising standing crops of Nankin suits of Khakee uniform on their parade grounds. I have, I think, dwelt sufficiently on hay culture to indicate how really stock farming is dependent upon it. I now, therefore, proceed with the subject of breeding and rearing cattle of all kinds, sheep, horses, and other beasts of burden. There can scarcely be any one present here to whom it is not apparent that vast improvement is possible in the breeds of horses, ponies, cattle, and sheep in this country. The country is a pastoral one; it affords splendid grazing in season, and is capable, without encroaching upon the growth of grain crops, of producing dry fodder in unlimited quantities to supplement grazing, and it is because its resources in fodder are undeveloped that the breeding of all kinds of domestic quadrupeds are so defective. The people, content with ploughs and agricultural implements of patterns with which Noah and his sons must have been familiar, in the matter of fodder rest satisfied with Bhoosa, i.e., the straw of wheat, barley, and vetches, partly broken up in their rude process of treading out the grain in lieu of threshing, and partly chopped up. They also store some supply of Kirby, i.e., the dry stocks of Indian corn, "Jowar," Bajra, &c., and in certain districts, like Gwalior, dry grass, I cannot call it hay, is stored for plough cattle and horses. The storing of this dry grass is entirely subservient to crop growing, and as the hay ought to be cut and cured in September when their ploughing operations commence, they will not accord it the necessary attention and labour; hence it is allowed to stand for months until the sap has receded from it, and it is of little or no value when it is collected. The value of properly cured hay may be estimated from the following:—1½ lb. of green grass are the equivalent of 1 lb. of dry grass. The regulation ration of army horses is 30 lbs. green grass or 20 lbs. hay, but this hay is the ordinary dry grass procurable in Indian markets. Of properly cured hay 10 to 12 lbs. is given by the Livery-stable keepers in Calcutta, and is found an ample quantity. There would thus be a saving of about 18 to 20 lbs., substituting properly cured hay for the green grass ration of Army horses, and of 8 to 10 lbs. by substituting it for the present hay ration of these horses. The quantity stored of this description of fodder, which in itself is very deficient of nourishment, and is only fit for horned cattle and sheep, is scarcely equal to the requirements of plough cattle and draught bullocks, in regard to which and to horses, for whom short grass is scraped from the surface of the land, I may say that stall feeding amongst the natives is confined; and it is to this absence of an attempt at cultivating and setting land apart for the growth of fodder that the failure of our stud-breeding operations to induce the natives to practise the systematic breeding of stock, is attributable. We have in fact first to get them to interest themselves in fodder cultivation, and then the stock breeding will follow, and the combined measures will result, I am confident, in an extended increase to the wealth and prosperity of the country. The great difficulty in inducing the natives of India to cultivate fodder is that, while such is procurable he does not care whether it be the best or not, and he will not spend money to improve the quality. In the United Kingdom cultivation of fodder is a necessity, the proportion of cattle to cultivated land being 29 per 100 acres, the average in India being only 10.5, while the proportion of waste land in India available for grazing is enormously more than in the United Kingdom. As regards my primary object as I have stated to you, viz., the improvement of the food of the European soldier, I will now place before you some statistical information which will perhaps facilitate my views. In the three Presidencies the latest returns show the total consumption of cattle and sheep for the supply of rations to European soldiers to be as follows:—

		Males.	Females.	Total
Bengal ...	Cattle	3,177	60,499	63,676
	Sheep	78,169	16,567	94,736
Bombay ...	Cattle	1,159	21,457	22,616
	Sheep	66,605	14,290	80,895
Madras ...	Cattle	1,022	19,426	20,448
	Sheep	59,935	13,187	73,122
	Total Head of Cattle ..			1,06,751
	Total Head of Sheep ..			2,48,753

Of the cattle 101,382 were cows and only 5,369 males; and of sheep 204,709 were males and 44,044 ewes. The proportion of female horned cattle slaughtered to that of males is very startling. It indicates, in my opinion, that while the supply of cattle is as yet very plentiful, in as much as that the necessity for reservation of a large proportion of females for brood purposes has not been forced upon the attention of the breeders, a very destructive system of slaughtering cows exists, which must in the long run materially affect the market. As regards sheep the proportion of ewes to males slaughtered, 44,044 of the former against 204,709 of the latter, is reasonable, and is due to restrictions having in 1873 been placed by Government on the number of ewes to be slaughtered by the Commissariat Department. This was occasioned by alarm being felt even then that scarcity should result from the indiscriminate slaughter of male and female sheep. The measure can, however, have had scarcely any effect, the number of sheep killed for troops being quite insignificant compared with that of the number consumed by the population, and it is my opinion that the scare of 1873 was by no means groundless, and that since then the supply of sheep has diminished.

The export of hides amounts to 8,605,796* annually, which, set against the number of animals slaughtered for the use of the troops, shows that the consumption for this purpose is a mere drop in the ocean, the more so when it is remembered that the expenditure of hides in India for all the different purposes for which leather is used is also enormous.

Hides.	
Calcutta*	6,938,936
Bombay	6,25,000
Madras	1,041,860
	8,605,796
Sheep Skins.	
Calcutta	222,987
Bombay	2,850,000
Madras	3,865,720
	6,938,707

From the cattle slaughtered for ration purposes the average outturn of ration meat is 143½ lbs. per head, and that of the sheep amounts to only 21¼lbs. These figures represent about one-fourth in each case of the average weight per carcase in England. Indeed I may go further as regards mutton, and say that an English leg of mutton weighs often as much as the average whole sheep in India. As a rule the best of the slaughter stock comes into the hands of Government, so the average weight per carcase throughout the country must fall far below the figures I have named. This would not signify if the quality of the meat were good. But I am forced to confess that it is very indifferent. The orders on the subject are that the troops shall be supplied with the best *grass* fed beef and mutton. But in a country where for half the year the grazing is of the most miserable description, and where no attempt is made to store and preserve for stall feeding purposes the immense surplus of fodder produced during the other half of the year, and no attempt is also made at breeding and rearing for the purpose, it is clear that "bad must be the best of it." I have said that improvement in stock must follow improvement in fodder, but so bountiful is nature in the wonderful vegetation which starts every year with the fertilising monsoon, that I think I may qualify this opinion, and say that, starting with that period, and storing the natural growth of hay, it is feasible to any one possessing grazing land to start the improvement in both matters simultaneously.

In England it is not beneath the dignity of noblemen to purchase young stock every year and turn it into their parks, re-selling it with great profit the next year, and in the interim going to but trifling expense in supplementing the grazing.

In India the conditions are different, and such results would, by no means, follow turning stock into grazing land, and allowing it to find for itself. But if part of the land were set apart for hay-making, and ensilage were resorted to in the early part of the monsoon, the system would be just as practicable and profitable in this country.

My personal experience as an Executive Commissariat Officer was that, during the dry season, of the cattle and sheep brought for sale, I used to have to reject a large proportion, and I have constantly had the dealers, who are not in this country graziers, offer to sell me the rejected animals at half price or even less. In the case of sheep I have frequently been obliged to reject entire droves, not finding any of them fit for my purpose, and in regard to both sheep and cattle, I have no hesitation in saying that any person possessing or renting a tract of grass land within twenty or thirty miles of any of our large cantonments, could, by purchasing stock during the dry months, allowing them to graze all over his ground for the first few weeks of the monsoon, and then reserving a certain portion of his land for grazing and collecting hay from the rest of it, laying out a small sum in the purchase of kirbee, and cultivating a few fields of lucerne, carrots, &c., could start operations with the monsoon, and turn out his cattle and sheep in prime order after a few months, increasing their weight very much, and giving us a vastly superior quality of beef and mutton. An enterprising person devoting his attention to this matter could by selection from the ewes passing through his hands, start a small flock of sheep to be gradually increased, to breed from; I could give him good rams obtained by crossing with the best English and Australian sheep at the Hissar Farm, and I think I could guarantee that the wool alone would pay the expenses of the flock. I should also be very glad to contract with him to purchase his live stock by estimated weight for ration purposes, and he would commence to recoup his outlay within the first three or four months. His expenditure in farm buildings, cattle enclosures, &c., would be but small, if conducted on the principle which I am now introducing at the Hissar Farm, where we find our object best answered by using light thatches supported on a few poles; and enclosures made by cutting and collecting the "jowasea," or camel thorn (the dry leaves of which by the way shaken in a heap on the ground, afford an excellent description of bhoosa for sheep), and rolling it into hedges to form the enclosures. I trust that, in my journeying through the country this winter, I may find one or two Muhammadan gentlemen of means who would be willing to embark in such a speculation as this, and I am sure that in such case Government would be willing to assist, as far as circumstances admit, by granting easy leases of grass land. As regards the Hindu section of the community, whose religious prejudices would prevent their having anything to do with slaughter stock, an ample field is open to them in the setting apart of grass land for breeding horses, mules, plough cattle and sheep, the latter for wool; and

If our District Officers and Political Agents will interest themselves personally in the matter, grazing and fodder farms will quickly spring up in different parts of the country. I have alluded frequently to the Government Cattle Farm at Hissar, regarding which I will now put before you some details, as the farm, until within the last year or two, affords a very notable instance of the mistake of placing too great reliance on grazing to the neglect of the necessary storage fodder to supplement the same. The principle formerly observed at the place having been to store but a very limited quantity of hay, under the idea that to take more off the farm land would interfere with grazing.

(To be continued.)

TUBERCULOSIS.

What is tuberculosis? That, we feel sure, has been a common question among readers of the *North British Agriculturist* during the last two weeks. We propose to answer it, and in doing so, we shall not content ourselves with a bare explanation of what is the diseased condition to which the term is applied, but we will attempt to give in plain language such an account of the malady as may enable nonprofessional readers to follow intelligently the important discussions that from time to time are raised concerning it.

Tuberculosis is the name applied to a disease in which there are developed, in various parts of the body, little growths, or tubercles, having a characteristic microscopic structure. It attacks both men and animals, and is known by a variety of names. Thus in the human subject it is this condition that is at the root of the ordinary form of what is termed Consumption, Wasting, or Phthisis; while in the lower animals, it is variously known as Pining, Consumption, Grapes, Kernels, Clyors, Angleberries, &c.

The growths from which the technical name of the affection is derived have a very variable distribution. In cattle their most common seat is the lungs and pleura (the lining membrane of the chest), while next in order of frequency comes the peritoneum (the lining membrane of the belly). In other cases the tubercles grow in the reproductive organs of either sex, in the spleen, the liver, the intestines, the kidneys, the udder, the brain, lymphatic glands, joints, muscles, &c. In most cases the new growths do not invade more than two or three of these situations, but in some instances there is a rapid development of the tubercles throughout the animal's system, and to this latter condition the term *acute or general tuberculosis* is applied.

The individual tubercles are of small size—smaller than a pin's head, but by coalescence they produce large masses of new tissue in the organs where they appear. Thus, in the lungs, the normal spongy structure becomes destroyed, and its place taken by solid masses, which, later on, tend to soften, break down, and be coughed up. On the pleura and peritoneum the aggregations of tubercles form large projecting masses, resembling a cauliflower or a bunch of grapes, and it is from these that many of the common names for the disease are derived. In the early stage the tubercles are of a greyish white colour, but when more mature they become yellow. When they attain a certain size, they tend to assume a consistence like cheese, and this may either soften and break down, or it may partially dry up, and become gritty from a deposit of lime salts in it.

Among the lower animals cattle are most frequently the subjects of tuberculosis, and after these come pigs. Goats are occasionall attacked by it, but it is doubtful whether horses, sheep, or dogs ever contract the disease spontaneously. Within recent years, however, it has been shown to attack fowls, and it at time proves a great scourge in the poultry yard.

From the various situations in which the lesions of tuberculosis appear, it will readily be understood that its symptoms are not well defined. When it attacks the lungs and pleura (which, as already stated, are its most common site), the animal suffers from a cough, evinces pain on pressure between the ribs, and steadily emaciates, until, if the disease is allowed to run its course, the animal is reduced to the condition of a living skeleton. If less vital parts are the seat of the new growth, the symptoms may be very obscure. It is almost an everyday occurrence for animals to be slaughtered "whose carcases present on the peritoneum and pleura most extensive growths of tubercle, such animals never having excited in the minds of their owners a suspicion of the serious affection of which they were the subjects." It is a point that cannot be too strongly emphasised, that an animal may have an extensive growth of tubercle in its system, and give no other evidence of it than a certain unthriftiness, and a lack of tendency to fatten, no matter how favourably circumstanced. Among cows a not infrequent seat of tubercle is some part of the generative system, such as the ovaries of the womb. The diseased process is here a common cause of sterility, and it at the same time creates a condition of sexual excitement which makes the cow almost constantly 'bulling.'

When the disease invades the udder, it produces a diffuse, firm swelling in which there is little or no pain. The swelling generally affects only one quarter of the udder, and for a considerable time, at least, the milk from the diseased portion may present to the naked eye no abnormal characters. The importance of the last mentioned point will be shown later on.

Tuberculosis is by no means a new disease. It has even been surmised that it was known in the time of Moses, and certain it is that it is referred to by some of the ancient writers in terms that leave no doubt as to its identity. Nevertheless, it is only within very recent years that a satisfactory account of its pathology has been given. The two important points that have for a long time been under discussion, and to which until recently no direct answer could be given, are—1st. Is tuberculosis an infectious (or contagious) malady? and 2nd. Is tuberculosis of animals identical with the like named disease in man?

Clinical observation had long ago led many eminent medical men to the belief that the disease was at times transmitted from a diseased individual to the healthy, the most common medium of infection being the material coughed up and expectorated from a diseased lung; though in some instances the inhalation of the same atmosphere with an affected person, or even the wearing of the clothes of one dead of the disease, was reckoned to be a sufficient cause. Similarly, some veterinarians had been forced to the conclusion that the introduction of a tuberculous cow was a great danger to the herd—in fact, that the disease spread by infection or contagion. Still, until very recently, these views did not meet with anything like wide acceptance, and perhaps the most general view of the nature of the disease was, that in certain individuals an inflammation of, say the lungs, or a lymphatic gland, excited by an ordinary cause (such as cold, &c.), was prone to be followed by a softening and breaking up at the seat of inflammation, and that the softened materials, when carried by the vessels to other organs, were capable of acting as an irritant, and setting up a growth of tubercles. It was not, however, generally believed that there was any similarity as regards contagiousness between tuberculosis and glanders or pleuro-pneumonia.

But if clinical observation had failed to afford convincing proof of the contagious character of tuberculosis, the same can hardly be said of the results of experiment. Gerlach attempted to solve the question by feeding animals either with tuberculous matter, or with flesh taken from animals having distinct tubercular growth in some part of the body. In this way he succeeded in producing the disease in 35 out of 46 animals when he fed them on uncooked tubercular matter and in 10 out of 15 with the same matter cooked. Of other 35 animals that he fed with uncooked flesh from tubercular cows, 8 became the subjects of tuberculosis. Other investigators tested the effect of tubercular matter when inoculated into the system of healthy animals. Thus, Baumgarten succeeded in producing tuberculosis in rabbits by inoculating them in the eye with blood taken from another rabbit affected with the disease. Toussaint also experimented in the same way, using as the inoculating material tubercular matter from the lungs, saliva, mucus from the nose, and urine, of tuberculous animals. All of those materials he found capable of setting up tuberculosis in such animals as pigs, rabbits, and cats. A third set of experimenters tried the effect of feeding animals with the milk of tuberculous cows. Johne, for example, fed two pigs and one rabbit with milk from a tuberculous cow, using the milk taken from an apparently healthy quarter of the udder. These animals were fed with this milk for about one month, and were killed after an interval of about six months. All the three animals were found on *post-mortem* examination to be extensively affected with tuberculosis. In another case he fed 3 pigs and 2 rabbits with milk, part of which was taken from a quarter of the udder affected with tuberculosis. These animals were fed with the milk for about five weeks, and were killed after an interval of two months. After death both pigs and rabbits showed in various parts of their bodies extensive growths of tubercle.

Many similar experiments might be cited, all having the same result; and in view of the evidence that they afford, and of the evidence in the same direction afforded by clinical observation, it is impossible to arrive at any other conclusion than that tuberculosis is a contagious malady.—*North British Agriculturist.*

TUBERCULOSIS IN CATTLE.

Sir,—I feel glad that so able an authority as Professor Walley writes publicly on this matter. He asks, 'what I mean by a wholesale slaughtering and burial of the carcasses of phthisical cattle?' and he answers the question himself in the next paragraph when he says, 'I have advised, and do so still the slaughter of all animals in whose system tuberculosis is evidenced by positive symptoms; not only so, but I have gone further, and advised that animals in whose system there is strong presumptive evidence of the existence of the disease, but with compensation to the owners.' May I presume that the carcasses of all these animals that were slaughtered, showing phthisical tubercles or scrofulous lesion were destroyed, and that these are the suppressive measures that are demanded? Whether rightly or wrongly, this is certainly an innovation from the general rule. Professor Walley goes on to say, 'Does "J. H." know what he is writing about?' Certainly not properly, as I am very anxious to know a great deal more; but I am happy to say, for the sake of frail and suffering humanity, that I am not prepared to accept of the terrible conclusion he has arrived at, when he says, 'Once for all, let it be distinctly understood that tuberculosis is absolutely incurable.' The progressive nature of science is a wonderful power, and the recuperative power of nature is by far more marvellous still, being nothing less than the veiled power of the Divine Framer. Therefore, I cannot agree with Professor Walley, when he says that the system cannot wholly recover its strength again. I think I have known cases where the morbid deposit had become liquified, and absorbed and thrown off by the invigorated system. Furthermore, cannot Professor Walley see something like a line of demarcation in his admission of the disease being capable of being arrested in its progress by the active and affecting media becoming quiescent? I think this, in veterinary practice, is quite a common occurrence, and the animals fed up and sent to the fleshers. Does he imagine that flesh from such a source, when not containing an active virulent virus, would cause phthisis in a highly susceptible human subject? For my part, I think that would be drawing the matter ridiculously fine, as if such could be the case, we surely should have little difficulty about the supposition that such a susceptible individual, even without eating such flesh, could not escape the influence of the almost universal germ. It would be interesting to know how far vegetarians are exempt from consumption in comparison with flesh-eaters. Butchers could tell a curious tale of how many meningeal, tuberculous, and other deposits they find in and on animals slaughtered for human food. So that if every case were to prove deleterious, I should consider few people, in the large cities at least, could escape the malady. I must confess that I do not think this matter has been sufficiently investigated yet, and that there are some kinds of tubercle that must give something like negative result; and I know of no argument that can be brought forward to show that eating the flesh of animals slaughtered while suffering from the active and virulent form of phthisis, or supping their milk while yet alive, might not be followed by dangerous results, so that some restriction does seem imperatively necessary. But looking upon the extreme difficulty of the matter from many points of view, does it not seem clear that a regular radical and sweeping measure, at least to begin with, would be unwise, and that there should be a limit to the restrictions until a better knowledge of the subject is attained to?—otherwise the thing looks quite impracticable, as it seems certain there would, as the matter stands meantime, be no end of hardships through blunders, misconceptions, misunderstandings, &c. Few things, however beneficial, can be arrived at all at once, and I think it might probably be going far enough at present to make it compulsory for owners of animals to give due notice about suspicious animals and as soon as they shew positive symptoms of the malady make it compulsory to either have them slaughtered, and their carcasses buried, or put under proper treatment for a reasonable period, and if the disease becomes even arrested, have them quickly fatted and sent to the flesher, and if it is not arrested, to have them destroyed, and their carcasses buried. I have no great belief in its ordinary contagiousness unless a healthy animal be kept in continuous contact with a diseased one—say, tied up in the same stall together, the diseased one having a stall to itself, or, better still, a separate apartment of the building, there need be little fear of infection. My views regarding milk taken from a cow in active consumption, even although it may be free from any organic contagion, is that it is not fit for human food, but if the disease respond to treatment and the animal becomes—if you will, *so-called*—cured, or the malady arrested and quiescent, then I consider it harmless. I have drank such milk with composure and relish. If, however, there are signs shown of tubercular liquification, or small tubercles be detected in the glands of the udder, &c., I would look upon the matter with the greatest suspicion. I do know there would be difficulty, and indeed seeming impossibility in having every case tested microscopically; but ought there not to be more general knowledge of how dangerous tuberculosis really is, as it would seem to be not merely a shilly-shally policy, but a perfect absurdity, to place under restriction as dangerous every animal that might have the misfortune to be suffering from any sort of tumours that seem so often to be looked upon as tubercular or scrofulous, and dangerous in, may it be said, less practical part of the globe.—I am, &c.,

J. H.

—North British Agriculturist.]

DAIRY LESSONS FROM CANADA.

The advanced report of the Canadian Experimental Farm has still many interesting facts in it relative to dairying, which we were unable to incorporate in our lengthened article on the subject last week. The size of butter globules in milk may appear a matter of no practical importance to many people at first sight, but they have, nevertheless, their functions to perform and their tales to tell. Professor Brown prefaces his advance notes of his experiments with illustrations of butter globules in the milk of twelve breeds of cattle, and these show that, as regard large globules, the shorthorn and Aberdeen polled breeds hold a high place over the standard. The Jerseys and Holsteins are almost equally high; still all these four breeds differ materially in the proportion of small globules.

It is rather singular that the two best beef-making breeds should, as regards butter globules, be classified as the two extremes. It is not so surprising to see the black polled breed taking the lead as it is to find the popular Hereford lowest, for it is commonly the case that a good beef-maker is a rich milker.

To what extent does the size of butter globules influence the time occupied in churning? This question is one of great importance to dairymen. During the past six months an exact record has been kept on the Experimental Farm of the time occupied in churning butter from all sources, at a temperature of 62 degs., and the results are produced in tabular form in the work before us. The average time occupied in churning in winter was twenty-five minutes, but five minutes more were required in summer. This difference in time is not easily accounted for, but it is suspected by Professor Brown to be due to the length of time intervening between the date of calving and that of churning. The record shows that in every case but one, time and size of globules agree with remarkable uniformity—the short time and the large globule being inseparable. The one exceptional case referred to is that of the Holstein cow, whose milk possesses larger globules than four of the other breeds tested, but which required an average of 40 minutes to churn. The milk of the Guernsey, which is far and away ahead of that of all the other breed—which include in this instance Guernsey, Jersey, Ayrshire, Devon, Holstein, shorthorn, and shorthorn grade—required the least time—only ten minutes; while in the opposite extreme we find the shorthorn grade, whose milk is least in size of globules, and which consequently requires so long as forty minutes' churning. The third position is accorded the celebrated Ayrshire among the seven breeds, as to the size of globules and the time occupied in churning, the latter being twenty-two minutes. The shorthorn is lowest in the list but one—the shorthorn grade—the time spent in churning its milk being forty minutes. The prosecution of such a study as the foregoing facts afford is not only scientifically interesting, but is of direct practical value to dairymen, for, as Professor Brown points out, they unquestionably have something to do with the ripening and keeping properties of cheese as well as butter.

With the view of discovering the suitability of winter milk for the manufacture of cheese, and also ascertaining the breed of cattle richest in cheese-giving properties, extensive experiments have also been made. Ten breeds of cattle were attested, and in his commentary on the results, Professor Brown says—'The Jersey seems to bow to nothing—not even in cheese and solids in winter, for, taking an average of the rennet in chemical testing, its mean of 14·85 is considerably over all others. The Devon has rarely been second in cheese in our experience, and now again takes a lead, subject only to a fuller Guernsey record. The nearest agreement of rennet and chemist is in the case of the Ayrshire and Aberdeen poll. The Ontario farmer will note with satisfaction the position taken by the shorthorn grade, nor will he be displeased at that of the ordinary cow, whatever that may be. The Galloway and shorthorn are close competitors, the former leading.

The comprehensiveness of the experiments is indeed remarkable. Almost every phase of the dairy industry is firmly taken up, while they extend to other branches of agriculture. In the feeding of calves with skim milk, experiments were conducted for a period of six months beginning in November last year, from which stockmen cannot fail to derive a valuable lesson. The calves—shorthorn grades—one bull and one heifer—were allowed three days with their mothers before being supplied with skim milk. The milk was warmed and supplied in two meals at the daily rate of 18lbs., along with a teacupful of oatmeal, 1½ table-spoon linseed meal, 1½ table-spoon molasses. This mixture was supplemented with quantities of clover hay until the twelfth week, after which their provender was increased by the use of bran and roots, with hay. The object of the experiment was, if possible, to make a good calf at less cost than by giving it full ration of milk from the cow, and Professor Brown, referring to its results, says:—

'A calf gained 304 lbs., with skim-milk and other food; the food other than the milk cost 2 dols. 8[illegible] cents. The calf, as veal, is worth 15 dols., so that we received 11 dols. 77 cents for the milk consumed. This is the lowest possible use of the milk. Were the calf retained for breeding, or for a store steer, its value is invariably placed at one-third more than veal price, so that in this case we find the value of the milk to be 9 dols. 90 cents. Then again, supposing the calf had got the whole of the full milk with the roots, bran, and hay only, its production would have cost 20 dols. 17 cents, but by taking the cream from the milk and selling to a butter factory, and by adding other concentrated foods to the milk, the calf was produced for 11 dols. 82 cents. On an average of methods representing the value of skim-milk, we got the sum of 11 dols. 34 cents, so that skim-milk was fairly valued at one-half that of the full milk is borne out by this test. We are satisfied that on an average of winter and summer conditions, for the usual six months of a factory run, each cow will return 7 dols. more by supplying cream and giving with the skim-milk some such additions as we have shown.—*North British Agriculturist.*

Holloway's Ointment and Pills.—In all outward complaints a desperate effort should be made to at once remove these annoying infirmities, and of establishing a cure. The remarkable remedies discovered by Professor Holloway will satisfactorily accomplish this desirable result, without any of those dangers or drawbacks which attend the old method of treating ulcerative inflammations, scrofulous affections, and scorbutic annoyances. The most timid invalids may use both the Ointment and Pills with the utmost safety with certain success, provided a moderate attention be bestowed on their accompanying "Directions." Both the preparations soothe, heal and purify. The one assists the other most materially in affecting cures, and renewing strength by helping exhausted nature just when she needs such succour.

WHAT IS THIS DISEASE THAT IS COMING UPON US?

LIKE a thief at night it steals in upon us unawares. Many persons have pains about the chest and sides, and sometimes in the back. They feel dull and sleepy; the mouth has a bad taste, especially in the morning. A sort of sticky slime collects about the teeth. The appetite is poor. There is a feeling like a heavy load on the stomach; sometimes a faint all-gone sensation at the pit of the stomach which food does not satisfy. The eyes are sunken, the hands and feet become cold and feel clammy. After a while a cough sets in at first dry, but after a few months it is attended with a greenish coloured expectoration. The afflicted one feels tired all the while, and sleep does not seem to afford any rest. After a time he becomes nervous, irritable, and gloomy and has evil forebodings. There is a giddiness, a sort of whirling sensation in the head when rising up suddenly. The bowels become costive; the skin is dry and hot at times; the blood becomes thick and stagnant: the whites of the eyes become tinged with yellow, the urine is scanty and high-coloured, depositing a sediment after standing. There is frequently a spitting up of the food, sometimes with a sour taste, and sometimes with a sweetish taste; this is frequently attended with palpitation of the heart; the vision becomes impaired with spots before the eyes; there is a feeling of great prostration and weakness. All of these symptoms are in turn present. It is thought that nearly one-third of our population has this disease in some of its varied forms. It has been found that medical men have mistaken the nature of this disease. Some have treated it for a liver complaint, others for kidney disease, etc. etc., but none of the various kinds of treatment have been attended with success, because the remedy should be such as to act harmoniously upon each one of the organs, and upon the stomach as well: for in Dyspepsia (for this is really what the disease is) all those organs partake of this disease, and require a remedy that will act upon all at the same time. Seigel's Curative Syrup acts like a charm in this class of complaints, giving almost immediate relief. The following letters from chemists of standing in the community where they live show in what estimation the article is held.—

John Archer, Harthill, near Sheffield:—I can confidently recommend it to all who may be suffering from liver or stomach complaints, having the testimony of my customers, who have derived great benefit from the Syrup and Pills. The sale is increasing wonderfully.

Geo. A. Webb, 141, York-street, Belfast:—I have sold a large quantity, and the parties have testified to its being what you to represent it.

J. S. Metcalfe, 55, Highgate, Kendal:—I have always great pleasure in recommending the Curative Syrup, for I have never known a case in which it has not relieved or cured, and I have sold many grosses.

Robt. G. Gould, 17, High-street, Andover:—I have always taken a great interest in your medicines, and I have recommended them, as I have found numerous cases of cure from their use.

Thomas Chapman, West Auckland:—I find that the trade readily increases. I sell more of your medicines than any other kind.

N. Darroll, Clun, Salop:—All who buy it are pleased, and recommend it.

Jos. Balkwill, A.P.S., Kingsbridge:—The public seem to appreciate their great value.

A. Armstread, Market-street, Dalton-in-Furness:—It is needless for me to say that your valuable medicines have great sale in this district—greater than any other I know of, giving great satisfaction.

Robt. Laine, Melksham:—I can well recommend the Curative Syrup from having proved its efficacy for indigestion myself.

Friockheim, Arbroath, Forfarshire, Sept. 23, 1882.

Dear Sir,—Last year I sent you a letter recommending Mother Seigel's Syrup. I have very much pleasure in still bearing testimony to the very satisfactory results of the famed Syrup and Pills. Most patent medicines die out with me, but Mother Seigel has had a steady sale ever since I commenced, and is still in as great demand as when I first began to sell the medicine. The cures which have come under my notice are chiefly those of liver complaint and general debility.

A certain minister in my neighbourhood says it is the only thing which has benefited him, and restored him to his normal condition of health after being unable to preach for a considerable length of time. I could mention also a great many other cases, but space would not allow. A near friend of mine, who is very much addicted to costiveness, or constipation, finds that Mother Seigel's Pills are the only pills which suit his complaint. All other pills cause a reaction which is very annoying. Mother Seigel's Pills do not leave a bad after-effect. I have much pleasure in commending again to suffering humanity Mother Seigel's medicines, which are no sham. If this letter is of any service, you can publish it.

Yours very truly,

(Signed) WILLIAM S. GLASS, Chemist.

A. J. WHITE, Esq.

15th August, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's syrup which he got from me has saved his life.

Yours truly,

Mr. WHITE. (Signed) N. WEBB,
Chemist, Calne
(B)

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THE

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A WEEKLY

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VOL. X.] CALCUTTA :—SATURDAY, OCTOBER 24, 1885. [No. 43.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 14TH OCTOBER 1885.]

Madras.—General prospects fair; continue favourable in Bellary and Anantapore.

Bombay.—Rain throughout the Presidency, excepting Sind; *kharif* crops generally doing well, and sowing of *rabi* crops in progress. River falling in Sind, and crops suffering in parts of Karachi and Hyderabad from deficiency of water, standing crops damaged by rats and storms in parts of Hyderabad, and by blight in parts of Ratnagiri. Cholera and fever in parts of thirteen and cattle-disease in parts of ten districts.

Bengal.—Slight and not general rain during the week. A little more rain is now wanted in some places. Prospects of *aman* rice and other standing crops generally favourable except in the flooded parts of Burdwan and Presidency divisions. *Bhadoi* outturn not very fair, on the whole, as the crops in many places suffered from excessive rain and flood in August and September. Cultivation of *rabi* crops being carried on vigorously. Price of rice improving slightly in some districts. Prevalence of fever reported in many places.

N.-W. Provinces and Oudh.—Slight rain in places. General prospects fair. Cholera, fever, and cattle-disease continue in places. General health fair.

Punjab.—Slight rain in the Rawalpindi, Dera Ismail Khan, and Peshawar districts. Fever prevalent in the Delhi and Peshawar districts and in the Kahuta tahsil of the Rawalpindi district; a few cases of cholera in Bhiwani and of cattle-disease in Bajwat, in the Sialkot district. Crops suffering from want of rain in the Ferozepore and Sialkot districts. *Rabi* operations in progress. Prices fluctuating.

Central Provinces.—Rain has fallen in northern and western districts, and prospects have improved, it is much needed in Chattisgarh and especially [illegible], where crops on uplands are reported to be lost. Prospects [illegible] fair, and prices steady.

British Burmah.—Cholera severe in three districts, slight in five districts; elsewhere public health good. Cattle-disease slight in eight districts; elsewhere health of cattle good. Crop prospects good. Rains seasonable.

Assam.—Weather seasonable. Public health good; cattle-disease still in some [illegible]. State and prospects of crops favourable. Days warm, nights cool. Prospects of *sali* crops fair. Tea doing well. Common rice 14 seers 8 3.5 chittacks per rupee. Land being prepared for mustard.

Mysore and Coorg.—Good rain fell throughout the State; about 24 small tanks reported to have breached in the Kadur district. Standing crops improved by the rain; horse gram and *ragi* are generally being sown; paddy seedlings transplanted in [illegible], and paddy sown in Kadur. Ploughing operations for wet cultivation in progress in the Bangalore district. Prospects of the season and public health good, 5 cases of cholera reported in the Shimoga district; cattle improving in condition, but murrain still prevails in parts of the Shimoga and Kadur districts. Prices throughout show a tendency to fall, and in Tumkur district the price of *ragi* is reported to be rapidly falling. Crops in good condition. Cardamoms being picked.

Berar and Hyderabad.—Weather clear in Amraoti. Prospects of crops favourable; *rabi* sowings in progress. Wheat 27 and *jowari* [illegible] seers per rupee. Rain throughout the district of Akola has done good. Standing crops good, *rabi* seedlings commenced in Hyderabad, sowings postponed in Pathri taluka on account of incessant rainfall. General health fair. Common rice 12¾, white *jowari* 17¾, yellow *jowari* 24½, and *tur* 17½ seers per current sicca rupee.

Central India States.—Prices stationary. Late rainfall has much improved the prospects, but water in wells and tanks is very low. Cholera at Rewah, 12 cases, 7 deaths. Rain much wanted in some parts. Prospects of crops improved in Sehore. Prices [illegible]. Health good. Crops and sowing prospects much improved by late rain in Manpore, where anxiety is removed.

Rajputana.—Rainfall scanty in nearly all parts. Tanks, wells, health and crops good in parts. Cholera almost disappeared. Crops seriously damaged from want of much required rain in Marwar. Prices rising. Crops withering from want of rain in Meywar. Indian corn being cut, about 4 anna crops. Rice withering and very poor. *Rabi* sowings commenced, but not promising. Tanks decreasing in parts. Rain very greatly needed in Harowti, fever is prevalent. Tanks and wells drying in Korowli. Fever prevalent. *Dhani* crops damaged. Rain urgently required. Tanks drying. Wells decreasing. Crops withering for want of rain in Dholepore where fever continues.

Nepal.—Prospects good. Cholera has ceased.

Letters to the Editor.

THE COFFEE BUG.

TO THE EDITOR.

SIR,—A gentleman, signing himself, "AN ANXIOUS ENQUIRER," writes to me from Ceylon, and asks me to suggest a remedy for the destruction of a bug (a species of *coccus*), which commits great ravages among the coffee plantations. In reply, I beg to advise him, through the medium of your valuable paper, to plant mulberry trees among the coffee plants, when the insect will immediately forsake the one and fasten on to the other. They may also be killed with the fumes of tobacco and sulphur. I take this opportunity to inform the public (who take an interest in agri-horticultural matters), seeking information from me on these subjects, should do so through your valuable columns, so that not only individuals, but the public at large, may have the benefit of any suggestions it may be in my power to offer.

HEM CHUNDRA DUTTA.

Calcutta, October 14, 1885.

TEA-PLANTING.

TO THE EDITOR.

SIR,—Will your correspondent, Baboo Hem Chunder Dutta, kindly enlighten me, and a number of would-be Tea speculators on the following points :—

(1) What is the best climate for tea cultivation?

(2) What is the best manure?

(3) Would it be safe and healthy for the owner of a tea garden to live on the estate?

(4) Is elevation necessary for tea cultivation; if so, to what extent?

(5) What labor would be necessary?

(6) What amount of profit would a speculation in tea yield?

A WOULD-BE PLANTER.

NOTE.—With such entire ignorance of the subject, we should not advise you to launch into tea cultivation. Better try something else, of which you have some knowledge. If, however, you are determined to try tea, procure a copy of the *Tea Planters' Vade Mecum*, recently published by the Editor of the *Indian Tea Gazette*, 10, Hare-street, Calcutta.—ED., *I.A.*

FOOT-AND-MOUTH DISEASE.

TO THE EDITOR.

SIR,—Will any of your numerous able correspondents enlighten me and a number of agriculturists as to the causes, symptoms, and cure of foot-and-mouth disease in cattle?

I hope your able correspondent, Doctor [illegible], of Etawah, will kindly oblige us with the information I seek.

AN AGRICULTURIST.

Burdwan, October 20, 1885.

NOTE.—A reference to the *Indian Agriculturist* for 1884, pp. 124, 146, and 212, will give some information on this subject. But for the convenience of our readers, we have summarised the information, which will be found among our editorial notes.—ED., *I.A.*

Editorial Notes.

The net amount of Indian sea and land customs revenue, exclusive of the salt revenue, for the first six months of the current official year, amounted to Rs. 51,22,000, as compared with Rs. 42,41,000 during the corresponding period of last year.

⁂

Professor Walley has replied to the letter of "J. H." in the columns of the *North British Agriculturist*, on the subject of tuberculosis in cattle. The continuation of the leading article on the same subject by the Veterinary editor of that journal bears out the Professor's conclusions in all respects. We reproduce both articles elsewhere.

⁂

From local enquiries made, it is found that about 300,000 bigahs of paddy have been lost in Ooloobaria sub-division of the Howrah district, besides other crops. In the Midnapore district prospects are everywhere good outside the flooded tracts. At Johanabad there has been great loss in half of the sub-division. The report of the state of the crops in other parts of the province is pretty fair.

⁂

The trade returns of Victoria shew a considerable falling off. The imports for the month of August show a decrease of £131,967, and the exports £212,040, as compared with the corresponding month last year. The decrease in the exports is entirely due to a falling off in gold and wool, for in articles of general merchandise there was an increase. The agricultural prospects throughout the colony are reported as excellent, and a revival of trade is shortly anticipated.

⁂

We are informed that the annual Horse-Show at Rajkot was to have come off on the 22nd instant. An influential committee, with the Political Agent for Kattywar at its head, and including among its members, the Thakores of Palitana, Limri, and Rajkot, has been appointed. The princes of Kattywar are well known for their love of horseflesh, the royal paddocks of Bhownuggur, Gondal, and several other States containing as good specimens of the equine tribe as might well be found in any other part of India. This is not the only reason for expecting that the Show will in all probability be worthy of Kattywar. The offer of substantial prizes to the poorer class of exhibitors will, no doubt, afford them a sufficient inducement to bring their animals to the Show.

⁂

Judged by the figures quoted by a contemporary, the export trade of the Central Provinces during the second quarter of the current year, shows a marked decrease—something like 19 lakhs of maunds, the greater part of which is due to a falling off in wheat and cotton. The quantity of wheat exported was 3,162,951 maunds, compared with 4,244,395 maunds, during the same period last year. That of cotton exported amounted to only 6,988 maunds against 39,507 maunds last year. Rice and linseed also show a slight falling off. The imports, on the other hand, show a small increase. This is said to be chiefly due to the large quantity of *goor*, or undrained sugar, received from the N.-W. Provinces into the Jubbulpore and Nerbudda districts.

⁂

According to the last census, it appears that the population of the kingdom of Italy numbered 28,459,628, of whom 8,173,382 were engaged in agriculture, exclusive of children aged less than nine years. Of this agricultural population 1,325,879 are reported as cultivating their own lands; cultivating on shares with the proprietors, 1,045,339, and 401,643 are tenants. The labourers number over 5,000,000, of whom a little more than half are reported as engaged in steady labour, leaving nearly one-half engaged irregularly. Another division is given of the agricultural population as consisting of landed proprietors, who number 4,132,432, of whom, however, only 2,668,696 are represented as owning both lands and buildings, the rest consisting of those who own only the land without the building, or *vice versa*.

⁂

An interesting paper lately read at a meeting of the Saxon Economical Society in Dresden, gives an account of the introduction of the potato into Germany, and the gradual spread of its cultivation. In 1585 it was first brought into Germany from Italy. The first seed potatoes in Saxony were a present in 1591 from the Landgrave of Hesse to the Elector of Saxony. In 1647 they were grown as exotics in gardens at Leipzig. Swedish soldiers brought them into western Germany about the conclusion of the Thirty Years' War. In 1717 they were re-introduced into Saxony from Brabant, and within twenty-five years they began to be regularly cultivated, their use being much developed in the famine period of 1770-71. In the year 1882 over 9,000,000 acres were given up to the cultivation of potatoes in Germany, the produce amounting to [illegible] tons.

⁂

The experiments with Manilla hemp (*musa textilis*) in Southern India have been noticed by us from time to time. In 1882 plants were sent from the Saidapet Farm to the Government of Bombay for experimental cultivation in that Presidency; and from a reply recently sent by the latter to an enquiry of the Madras Government we find that, although the experiment was not an unqualified success, yet the plant had been found to thrive well in certain parts of Western India, and has established itself to a considerable extent. Nothing has, however, been done in the way of extracting the fibre as yet; but as Mr. Ozanne, the Director of Agriculture, has suggested that future experiments with the *Musa textilis* are to be confined to the Government Experimental Farms at Bhadgaon and Hyderabad (Sind), the Botanical Gardens, Poona, and the farm attached to the Poona College of Science, we may expect before long to hear something more satisfactory on this subject.

⁂

The agricultural statistics of New Zealand for the year ending with March 1885, show that the area under wheat fell off by 107,663 acres—from 377,706 acres to 270,043 acres, as compared with the area in 1884. Yet the yield is very high—26 bushels per acre in 1884, and 25·25 bushels in 1885. Oats, on the other hand, increased in area from 262,954 to 354,794 acres, and barley from 32,907 to 39,703 acres. The export trade in foreign meat has led to an increase of pasture and root crops, to provide for the keeping of more sheep, which have increased from 13,384,075 in 1884 to 14,106,337 in 1885. An increase of 722,262 in one year, in spite of the large number exported in carcase form, must be regarded as very satisfactory.

⁂

We learn that the system inaugurated last year, in the South Canara District, of establishing depôts at different points for the receipt and purchase, at certain fixed rates, of minor forest produce, such as myrabolams, wax, honey, &c., collected in the forests and brought to the depôt, bids fair to become in time an extensive industry, as it has already developed to a considerable extent, so much so that it has been found necessary to employ an additional establishment of clerks to keep account of the quality of produce brought in by the gatherers. Satisfactory as the undertaking promises to be from a revenue point of view, it is also found to serve as a check on forest fires, the gatherers of such produce being naturally anxious to protect from fire, as much as possible, the trees from the produce of which they earn a livelihood. Wanton damage to trees, so common, is also to a great degree prevented. The system will probably be extended in time to other districts, the Conservator being anxious to do so.

⁂

It is stated that in the Assembly of South Australia on September 2, the Commissioner of Crown Lands obtained leave to introduce a Vermin Destruction Bill, and made a startling statement in connexion with the increase of vermin, which is proceeding at a frightful pace, all attempts to reduce it being futile, and, in fact, rather encouraging than checking it. Interested persons are propagating rabbits by taking them in cart-loads and letting them loose in new country. Fraud seems rampant, scalps and ears being made out of rabbit skins to cheat the Government by obtaining double payments. Scalps are said to be brought in loads over the [illegible] border. The Vermin Board have raised this year [illegible] from the landholders, and spent it all, besides the amount supplied by the Government, the payments reaching alarming sums The new Bill will repeal the existing legislation, and revive the Act of 1870, which throws upon owners and lessees of land the responsibility and the expense of killing vermin.

⁂

We learn from a Madras paper that Monsieur Reynaud, Professor of Agrimony at Pondicherry, has raised some strong healthy plants from the seed of the Chinese "milk plant" (*dis soya*). It is a native of Japan *Yeou tou*. The Chinese use it largely, expressing the milk, which is used in its liquid state, and is also manufactured into cheese, it has not yet, however, found favour among Europeans, the flavour being unpleasant. The Chinese bamboo, Katang, has also been raised from seeds by M. Reynaud, this particular bamboo grows to an enormous size, and is valuable for a variety of purposes; all kinds of utensils are made of it—casks, tubs, buckets, troughs, &c. The Angola beans (*Cytisus Cacan*) sown a short time ago are thriving satisfactorily, and a good gathering is expected. They are by far the best beans for *haricot* and many other French dishes, a great recommendation is their easy digesting qualities and pleasant taste. The plant continues to bear for seven years, and is greatly prized in the Antilles for its economical usefulness, it requires little or no tending.

⁂

A CONTEMPORARY says —If we consider the railway mileage of each country in proportion to every square kilometre of land, we shall find that Belgium comes first with 14 5 kilometres of railway, Great Britain with 9·5, France with 5 6, Germany with 6 5, the smallest European States being Russia and Norway with 0 3. The United States, with all its enormous network, now only figures for 2 1 and Canada for 0 2, while Brazil, the Argentine Republic, Paraguay, Japan, and Queensland are only 0 1 each But if we view the subject from another standpoint—*viz*, that of the mileage to every 10,000 inhabitants—the position of affairs is singularly reversed. Queensland, which was at the bottom of the world's list in the former instance, now stands at the top with 70 8 kilometres of rail to every 10,000 people, South Australia 56 1, West Australia 49 6, New Zealand 41 7, New South Wales 31 1. The United States show for 36 8, and Canada 29 4 Naturally the European States are very low in the scale under this aspect, Great Britain being only 8 5, France and Germany 7 9 each, Belgium *7 7*, Holland 6 0, Russia 3 0. The lowest of all is India with 0 7.

⁂

THE concluding portion of Colonel Hunt's lecture on Stock Farming in India will be found among our selections this week It is perhaps needless to say that the subject chosen by Colonel Hunt is a most important one for India, and should receive careful attention The lecture is a thoroughly practical one, and the subject has been handled in a manner to leave no doubt in the minds of those who assembled to hear the speaker, that he had a thorough grasp of the matter in hand The account of the ensilage experiment, which was quite a success, brings to light one important point, *viz*, that silage improves by keeping—at any rate so far as the sour, pungent smell is concerned, and that the *quality* of the fodder ensiled, has an important bearing upon the quality of the silage produced [*Vide* paras 5 and 6 of Captain Murett's "Notes on Ensilage at Hissar, during 1884 85, embodied in the lecture] In our opinion, Colonel Hunt's lecture should be widely circulated

⁂

A CORRESPONDENT, whose letter will be found elsewhere, wishes to obtain some information on the causes, symptoms, and cure of foot-and mouth disease in cattle Some time last year, Mr. George Fleming, F. R. C. V S, President of the Royal College of Veterinary Surgeons, wrote to the *North British Agriculturist*, saying that "those who have most carefully studied the history of, and are best acquainted with, this disease, do not agree on the spontaneous origin theory of this malady. He was of opinion that its continued prevalence was due to imperfect sanitary measures or neglect in their application. He did not, however, mention the causes, symptoms, or cure, but a correspondent of the *Planters' Gazette* last year recommended sulphurous acid as a cure for foot-and-mouth disease in cattle. Two ounces of the acid should be put into a quart bottle, which should then be filled up with water, and a tablespoonful of this dilution given three times a day to the diseased cattle He found this remedy completely efficacious. In addition to giving the acid internally, he advises the moistening of the affected feet with the same dilution, applied with a sponge Care should be taken, however, not to confound sulphurous with sulphuric acid, as the latter would be productive only of mischief He went on to recommend the burning of a little sulphur once or twice a week in cattle sheds, as a prophylactic for the disease:—

"Take a slip of cardboard, or of extra stout brown paper about a foot long and two inches wide, and place on one extremity about as much coarsely powered brimstone as would lie on a penny piece, hold it by the other end, and apply the flame of a candle till the sulphur is ignited, and then wave it about in the shed in order to disperse the vapour among the cattle If there be straw, or anything else inflammable about, hold a tile, or something of the sort, in the other hand, under the burning sulphur, to catch any that may drop."

⁂

DR F KRAM, president of the Homœopathic Medical Society of Kansas, recommends that cattle affected with foot-and mouth disease, be brushed all over with good strong vinegar frequently, and that the mouth be syringed with vinegar several times each day, or as often as may be necessary to remove the slime therefrom The feet and claws, when affected, should also be washed with the same liquid. For a drink he recommends that a pound of nails be put into a gallon of vinegar, and allowed to rust there Then, after stirring well, put from one to four tablespoonfuls into every pail of water that the animal drinks, and keep plenty of salt within reach. Vinegar should be sprinkled freely all about the stable, and such as is derived from fermentation should be used. Cattle that have been exposed to the disease may be watered with the iron rusted preparation It is further recommended that the diseased animals be given chlorate of potash and phosphate of potash alternately, using the third or sixth decennial trituration Of each of these salts, take of the size of a pea every morning, and put each separately in a bottle containing a half pint of water It is necessary to keep two additional bottles for administering, which should be cleansed carefully every time they are used. Give the two prescriptions alternately six or eight times a day, each time pouring into the administering bottle one sixth or one eighth of the daily prescription; then fill the bottle with water and shake thoroughly. When recovering, animals should have, every morning, phosphate of lime of one-sixth trituration in one half cup of water With these two methods of treatment to go upon, our correspondent and his friends may be able to effect some good We shall, however, be very glad to receive the opinions of our numerous readers upon the subject—especially in regard to the *causes* and *primary* symptoms of the disease.

⁂

THE study of agriculture, in theory and practice, is now engaging the attention of the Ceylon Government, and a local contemporary informs us that instruction in the principles of agriculture, in a practical manner, as suggested by Mr H W Greene, the Director of Public Instruction in Ceylon, is making satisfactory progress throughout the island. Further, that his system is directly encouraged by the local Government, and *suggests* that it might to some extent be adopted in this country He goes on to say that, since January last, theoretical agriculture has been taught in every Government vernacular or Anglo vernacular school in the higher standard, the text book in use being Mr Greene's primer. As another means of encouraging the study, all teachers are compelled to pass an examination in theoretical agriculture before they can obtain a certificate Practical agriculture is also taught as well as theoretical, and at the Colombo School of Agriculture this year the students have been taught the use of certain new ploughs, and have been engaged in practical experiments As soon as competent teachers can be provided, Mr. Greene proposes to ask permission from the Government to commence practical agriculture at several other schools, a piece of land being allotted to each school, and part of the produce being given to the teacher so as to induce him to take a real interest in the proper working of the land.

A CONTROVERSY has been going on in the columns of the *Englishman* under the curious title of "The Exodus of Bones." Mr. D. B. Allen, of the Bengal Agricultural Department, raised the question of bones as manure, and thought that the quantities annually exported from the country might be applied with better results as manure. This was followed up by a correspondent, signing himself "L. L.," who took the same view as Mr. Allen. We noticed both letters, and took occasion last week to observe that both these gentlemen had apparently overlooked a very important item for the fertilization of soils in the municipal sweepings which are daily carried away out of this city, and practically wasted. In the last letter on this subject signed "D. B.," the writer has taken the same as ourselves. We reproduce this letter among our selections, and hope it will be carefully read by members of the Bengal Agricultural Department. The truck-loads of refuse carried away daily by the Port Canning Railway might be more usefully utilized in fertilizing fields round about Calcutta. What is easier than to heap up all that refuse in open fields, set fire to it, and utilize the ashes in manuring fields? The ashes thus obtained would be found to contain the most essential properties of the best manures; while, from a sanitary point of view, it would be much better to bring the refuse of the city to this use, than to pollute the river Hooghly with it, as is the case under the present system of getting rid of it.

⁂

THE Mauritius Government evidently have a good eye to business. The Hon'ble W. Newton, President of the Chamber of Agriculture in this island, has drawn up a pamphlet entitled "La Crise Sucriere," in which he suggests certain measures for dealing with the crisis in the sugar industry. One of these suggestions is that it should be made known in India that animal charcoal is not used in the manufacture of sugar in Mauritius, so that it ought to recommend itself to the natives of India, who, on account of their religious prejudices, would give it preference over most other sugars in which animal charcoal forms a prominent feature in the manufacturing process. In order therefore to give this matter as wide publicity as possible, the Mauritius Government have requested the Madras Government to make it known in India. We are not sure that the natives of India attach very much importance to the use or otherwise of animal charcoal. When sugar factories were first started in this country, there was some reluctance on the part of the natives to use sugar manufactured under this process; but at the present time, western civilization has done much towards removing such scruples, and "religious sentiments," as far as we are aware, do not prevent their using the sugar manufactured by the Cossipore and other factories. We are therefore of opinion that if the Mauritius Government intend exporting their sugar to India, the only consideration likely to have any weight with the natives, will be cheapness; for it must be remembered that India is a sugar-growing country, and cheapness is a very important item with the natives.

⁂

MR. J. K. ROYLE, the Assistant Secretary to the Colonial and Indian Exhibition, has addressed a letter to the Government of India on the subject of the proposed display of live fish and of fish-hatching apparatus at the forthcoming Colonial and Indian Exhibition, and stating that the Royal Commissioners will gladly arrange to receive any living Indian fish, should it be found practicable to send any over. He at the same time forwarded a circular letter from Mr. Chambers, the Secretary to the National Fish-culture Association, giving the names of several Indian fish which have been already, or might with advantage be, introduced into England. The following is a text of Mr. Chambers's letter:—

> In relation to our conversation the other day, respecting the importation of Indian fish alive for the tanks in the Aquarium next year, I have to state that the following fish have already been introduced to this country, and are at present thriving well:—
>
> *Ophiocephalus gachua.*—(Indian walking fish.)
> *Trichogaster lalius.*—(Rainbow fish.)
> *Polyacanthus cupanus.*
> *Barbus puntio.*
> *Anabas scandens.*—(The climbing perch.)
> *Osphromenus trichopterus.*
>
> The following could also be easily introduced:—
>
> *Osphromenus olfax.*—(The best edible fish of the East.)
> *The Siluroidæ.*—(over 100 species, all of which travel well.)
> *Betta pugnax.*—(The fighting fish of Siam.)
>
> There are other Indian fish that might be acclimated, provided ordinary care were exercised. I am sure that the experiment would meet with success if tried.

⁂

THE experimental cultivation of Guinea grass on the Western Jumna canal appears to have been attended with better results than have been obtained in similar cultivations in the N.-W. Provinces. In August 1883 a quarter pound of seed was sown in ground manured and ploughed, occupying [illegible] of 0·026 acre, or 128 square [illegible], divided into *kiaris* or beds. The first cutting [illegible] taken in the November following, and yielded nearly 3 maunds, or at the rate of 113 maunds per acre. The next cutting was taken in May of the year following, and weighed nearly 2 maunds, while a third cutting in June weighed 3 maunds 3 seers. After this the roots of the plants were separated, and 10 new *kiaris* (beds) were planted, equal to 0·033 acre. These were cut in August and September following, and gave equally good results. The total yield from the 8 old *kiaris* was nearly 29 maunds, or an outturn per acre of 573 maunds, which may be regarded as very satisfactory. The ten *kiaris* of transplanted roots yielded a total of nearly 9 maunds, equal to an outturn of 265 maunds per acre, which is less than half of the outturn from the original 8 *kiaris*. The roots were planted in rows at intervals of two feet apart, in soil said to be "sandy and rather poor." Under the circumstances, therefore, the results compare very favorably with those obtained in the N.-W. Provinces, where the outturn per acre was about 350 maunds. It is noticeable that these experiments were made with artificial irrigation, which formed by far the most expensive item in the cost. It is, however, intended to try a plot of ground planted with this grass without artificial watering; and if it is found that good results can be obtained in this way, an important point will have been gained.

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THE following is a summary of Messrs. William James and Henry Thompson's fortnightly Circular of Indian tea, dated London, 24th September 1885:—Upwards of 35,000 packages have been catalogued for sale during the fortnight, including 3,500 from Ceylon and 2,500 packages of reprinted tea. The auctions have passed with good spirit, all fine qualities being competed for at firm prices. There has also been a brisk demand for leafy tea under 11*d.*, and for brokens under 10*d.*; but not so much enquiry for Pekoes and broken Pekoes between 1*s.* and 1*s.* 6*d.*, which in consequence are selling at rather cheaper rates, especially where liquor is wanting. Tea of superior quality continues to come forward from Assam and Darjeeling, and a few of the latest invoices from Cachar show improvement, although the majority are still fluctuating. Transactions have included the sale of 685 chests of fine tea from the Assam Company's Nazerah Factory, at 1*s.* 9*d.* average, and 900 chests at 1*s.* 5½*d.*, the corresponding shipments last season yielding 1*s.* 5¼*d.* and 1*s.* 0¾*d.* per lb., respectively. 110 chests from Bishnauth Dikorai Division sold at 1*s.* 11¼*d.* per lb., and 390 chests from Dooteriah sold at 2*s.* average. Receipts from Ceylon are mostly of improving quality, and are selling at higher prices, averages ranging from 1*s.* 2*d.* to 1*s.* 6*d.* per lb. The total shipments from Calcutta to 1st September were 18¼ million lb. against 16¾ millions last season. Arrivals to date (including Ceylon tea) are 14½ million lb., of which 11½ millions are sold. At the Calcutta sale on the 10th instant prices declined, and at the sale on 17th instant they remained without change, the quantity sold being about 25,000 packages, and the average prices obtained 9½ annas. At the corresponding sales last year, 29,000 packages were sold at 9·4 annas average.

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WE learn from a Bombay paper that the Forest Commission are at present circulating a series of notes upon the [illegible] experiments which Mr. Ozanne is carrying on. By laying before all interested in the matter what has been done in the way of experiment and research, the Commission hopes to [illegible] upon local customs :—(1) Regarding the cultivation of rice. (2) Regarding the variations in the manner of preparing rab and of the materials used, and of the proportions in which each ingredient is used. Consequently, they request that where the cultivation of rice differs from the method adopted in the experiments, they be informed of the points of difference, and, if possible, the circumstances which have caused these differences. A series of questions upon rab will soon be issued in a similar way, and the Commission invite remarks and criticisms from those competent to offer them. The experiments described in the "notes" have taken place at certain stations which seem judiciously selected. Mr. Ozanne withholds his opinion as to what deductions may be drawn from the results of the experiments until after the harvest, for not until then will all the data be in his possession. But he thinks that the following statements may be safely made from what he has ascertained by his experiments :—" (1) that cowdung rab is decidedly superior to all other varieties, and that the better the soil and better the season, the more is its superiority exhibited ; (2) that plots unrabed and unmanured are markedly inferior, not only to rabed plots but to manured unrabed plots ; (3) that manure unburnt is much inferior, as far at any rate as regards the area of transplantation, to manure burnt ; (4) that good results are obtained from leaf and grass rab. These results are much better than I anticipated, but here I must notice that the brushwood used for the ain and faugal plots was not cut early, as the people consider necessary. This fact may also account for the small superiority, nay in cases, inferiority, of ain as compared with faugal."

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The following is a summary of the health, crop, and weather reports for the week ending 14th October 1885 :—

In the Madras Presidency general rain has again fallen, and agricultural prospects are fair. In Bellary and Anantapore especially great improvement has taken place. In Mysore there has also been good rain. The standing crops have improved ; sowing, transplanting, and ploughing operations are in progress, and prospects are now said to be good. In Coorg crops are in good condition. Rain has fallen throughout the Bombay Presidency, with the exception of Sind. The *kharif* crops promise well, and *rabi* crops are being sown. In Sind rain is wanted. In the Berars and Hyderabad the recent rain has been beneficial to the crops, which promise well. Rain has fallen throughout the Central India States, but more is wanted at Neemuch and Agar. In Rajpootana the rainfall has been slight, and limited to a few places. In Marwar, Meywar, Kherwara, Harowti, Kotah, Jeypore, Kherowlie, Dholepore, and Bhurtpore, the rainfall has been insufficient, and more is wanted for the crops. In the Central Provinces the rain of the week has been confined to the northern and western districts. Prospects continue fair ; but in Chuttisgurh and Raipore more rain is much needed, especially on the highlands. There has been little or no rain in the Punjab during the week. Prospects are on the whole fair ; but more rain is wanted in the Ferozepore and Sialkot districts. *Rabi* operations in progress. Slight rain has fallen in the North-Western Provinces and Oudh, and general prospects are fair. In Bengal a little more rain is said to be wanted in places. Except in flooded tracts, the prospects of *aman* rice, and other standing crops are generally favourable. The *bhadoi* outturn generally has not been good, owing to the damage caused to the crops by floods in many places. *Rabi* cultivation is progressing vigorously. In Assam seasonable weather continues, and the crops promise well. In British Burmah crops prospects are good. The public health is on the whole fair. Prices are fluctuating in the Punjab, the Central Provinces, and the North-Western Provinces and Oudh, and are falling in Mysore, and to some extent in Bengal.

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According to *Forestry*, other materials than green food considered unfit for cattle food and used mostly for litter, such as straw, fern, &c., may be packed in the dry silo. Rye-straw thus treated in a proper fashion makes an ensilage which all stock like, and is a specially excellent fodder for cows in milk and lambing ewes. Old chalk pits with deep sides, a close-sided shed or building may be easily turned into such a dry silo, or the open stack plan would serve. A silo can be made in the bay of a barn by boarding up the midsty as high as the beam, with stout planks well secured, and battened across. The process is as simple as it is old amongst sheep-farmers of Essex and the eastern counties of England. The material, cut as short as possible, is carried, say, into the barn, where a number of men and boys, each with a wooden rammer in each hand, ram and tread it hard ; also finely-powdered salt is scattered over it to the extent of about 1 lb. to the cwt. of chaff ; while the water from a fine rose is at the same time gently showered over it. In warm weather, and with dry chaff, a gallon of water to the cwt. of chaff is used. When the chaff rises in the barn, use only half this quantity of water. The whole mass of chaff treated is every night levelled at top. Heavy planks are laid on, at each filling and settling, to compress it. Chains are used fixed to staples in the barn floor ; by fixing a screw jack to a link and taking a bearing on the planks, extra pressure is obtained. So hot does this chaff become after a few days that the hand cannot be comfortably held in it. It will have cooled down in six or seven weeks, assuming a black bronze colour, with an aromatic fragrance ; it is then fit for use. It has to be opened at the under side, an American hayknife being useful for cutting into it. If well covered down, it may be kept for two or three years. Waste hay, old malt-dust, fern, lawn-mowings, as well as leaves of mangold-wurzel, pea-haulm, tare-straw, when cut short and added to the matter packed in the silo, increase its appetizing flavour. Rye, besides being thus used in the dry silo, when early sown in August, can be sheep-folded it may be then in early spring cut green for stock ; afterwards a good plant for seed may be had—so we may count four crops from a plant that grows on poor soils, and seldom fails.

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The returns of the railway-borne trade of the Bombay Presidency for the quarter ending 30th June 1885, show a remarkable improvement over the other quarters. This is chiefly due to the returns having reference to the busiest part of the year. The entire trade of the Presidency has been divided into three heads, and compared with the previous quarter, was as follows :—

	Previous quarter mds.	Current quarter mds.	Difference.
(1) Imports from External blocks.	8,961,615	10,797,930	+1,836,315
(2) Exports to Do.	2,088,474	2,757,517	+ 669,043
(3) Local Trade	7,425,701	9,847,833	+2,422,132
Total maunds ...	18,475,790	23,403,280	+4,927,490

Compared with the corresponding quarter of 1884-85, the traffic shows an increase of 1,532,604 maunds, or 7·0 per cent. The trade under the first head is composed of 10,408,387 maunds of principal, and 389,543 maunds of minor, commodities, imported from the other provinces, of which the Central Provinces contributed the largest share, and Mysore the smallest. Wheat, oil seeds, grains other than wheat, and raw cotton constitute the bulk of the trade. Compared with the figures for the corresponding period of last year, the total imports show a small decrease in the case of wheat and raw cotton, but a considerable increase in oilseeds. The decrease in the wheat from the Central Provinces, is amply made up for by a corresponding increase from the Punjab, Rajpootana, Central India, N.-W. Provinces and Oudh, and Berar. The increase over last year's figures in the exports, or second head, amounted to nearly 325,000 maunds, of which the Central Provinces and the Nizam's territory took the largest share, and Sind the smallest. The exports were chiefly made up of coal, cotton goods, gunny-bags, metals, salt, sugar and tobacco. Compared with the figures of the corresponding period last year, there is found to be a falling off in coal, gunny-bags and tobacco, while the traffic in cotton goods, metals, salt and sugar, show a very large increase. It is observed that the greater portion of the coal exported belongs to the railway companies, while the bulk of the gunny exports represent empty bags returned to the blocks whence wheat, other food-grains, and oilseeds are imported in large quantities. The trade under the third head—local trade, shows an increase of 8·0 per cent over the corresponding period of last year. The increase is principally confined to coal, food grains other than wheat, oilseeds, salt and sugar, while there is a corresponding decrease in wheat and raw cotton. On the whole, the quarter under notice appears to have been a brisk one for trade.

A CORRESPONDENT, writing to the *Pioneer*, bears testimony to the soundness of the views expressed by Colonel Hunt in his recent lecture at Simla, on 'Stock-farming in India.' He says :—

In 1867-68, I got what I believed to be a ½ or ⅝ bred Romney Marsh ram lamb from a friend at Agra. I forgot how it came into his possession, but he had it as a pet till it became mischievous. I was stationed some distance in the district,and had a private flock of about 50 sheep of sorts which I bred partly as a pastime, but principally for the table. This with some cows I had been improving some five or six years, and even with common country animals, the result was remarkable. I had plenty of good sound grazing, and yearly gathered some tons of hay. On getting the young ram, I took a little more interest in the sheep, and being a North Aberdeenshire man and brought up with sheep in my earlier days, I had some idea of, as well as a liking for, their management. I selected my ewes to what I best thought suited my purposes, and increased my flock (by purchase in the villages) to about [illegible] good healthy selected ewes. During the first year this was increased to about 75, and in 1873 I had about 220 ewes, scarcely if any inferior to pure bred sheep, the mutton often weighing 140 lbs. (in 2 and 4 teeth) the mutton and fleeces superior to any I have seen at least in India. The sheep had as a rule (less 20 wethers) nothing but grazing, but on coming in at night found a "laik" with plenty of hay in the centre of their enclosure, and in the morning a lump of salt in a trough was offered ; sometimes they licked freely, other times passed on. They were very exceptionally free from all diseases even to small-pox ; and rot, a common disease in the district, was unknown to them. Among the 20 wethers, 5 seers gram (whole) with a sprinkling of salt was allowed every evening, and as one was killed another was put on. The principal difficulty I had was that about 75 per cent of my days I had to be absent from my head quarters for four or five days at a time ; then the sheep were left to the care of a servant who made the best of his opportunities. Coming home after a longer than usual absence, I had a very heart-breaking inspection, and at the time a Meerut butcher came up and offered me Rs. 3-8 all over. I selected 50 wethers and sold the remainder at Rs. 3-12 all over including lambs at foot. In the many changes since I have lost sight of my accounts, but suffice it to say that the young bulls and sheep fleeces more than paid total cost of cows and sheep including mutton for table for a family of six or seven. I have no hesitation in saying that any old pensioner with a family could not turn his hand to a better use, or make better provision for his family had he sufficient to start him on a sound pasture. He must have had some knowledge of cattle and sheep in his pre-army days, and be independent of his shepherd or native superstition, and keep his weather eye open.

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WE learn from one of our English exchanges that Professor Brown read an interesting and instructive paper, on '*Food in Cattle Life*' at a recent meeting of farmers in Canada. Previous to reading his paper, Mr. Brown distributed cards to the farmers present, giving the following statement of the result of nine years' testing with store steers at the Ontario Experimental Farm :—

	Daily Increase per head	Cost per lb. of added weight.
1. Permanent pasture	2·05	2
2. Hay pasture	1·15	5
3. Mixture of corn, peas, oats and barley, with hay and bran	2·25	8½
4. Cooked hay, roots, and bran, with mixture of grain uncooked	1·80	9
5. Hay, roots, and bran, without grain ...	2·14	9
6. Corn, with hay, roots, and bran ...	2·00	9¼
7. Peas, with hay, root, and bran ...	1·91	9⅓
8. Uncooked hay, roots, and bran, with mixture of grain	2·60	9½
9. Oats, with hay, roots, and bran ...	1·94	10
10. Mangolds, with hay, and mixture of grain	2·38	10½
11. Turnips, with hay and mixture of grain...	2·30	10⅝
12. Cut hay and roots, with bran and corn ...	2·10	111·9
13. Mixture of grain, with oil-cake, hay, roots, and bran	2·00	11⅓
14. Mixture of grain, with 'Thorley,' hay, roots, and bran...	2·40	11⅞
15. Barley (black), with hay, roots, and bran	1·60	11⅔
16. Barley (common), with hay, roots, and bran	2·02	12
17. Rice meal, with hay, roots, and bran ...	1·81	12
18. Sugar beet, with hay and mixture of grain	2·70	12¼
19. Wheat damaged, and valued at 60 cents per bushel, with hay, roots, and bran...	2·00	12½
20. Uncut hay and root, with bran and corn	1·78	14
	2·02	10

Commenting on the table given above, Professor Brown said it was likely that no similar statement in variety and possibly of such practical value had ever been issued from one place before. All the conditions were as uniform and alike as could possibly be secured in conducting the experiments, so that nothing influenced the results excepting food. During the reading of his paper, Professor Brown drew a number of those present into discussion on the subject dealt with by his paper, and in this way he was enabled, by simply answering questions, to impart a great deal of useful and valuable information. 'In concluding,' said Professor Brown, 'it may be asked, what then is the practical value of all these experiments ? I would answer that my lesson from these experiments is that there is value in variety.'

THE USES OF COTTON-SEED.

To the average Indian reader the heading of this paper will, we fancy, scarcely be intelligible. To what other uses can cotton-seed be put, beyond that of sowing for the purpose of raising the cotton plant, which in its turn will yield the cotton of commerce ? The answer will, in all likelihood, be "why, none, to be sure ! Never heard that it had any other uses." And yet, our 'go-ahead' cousins across the Atlantic have found innumerable uses for an article which, not many years ago, formed the subject of much speculation as to how it was to be got rid of, and which was regarded as an unmitigated nuisance. Our information on the subject was necessarily limited ; for we do not remember to have heard of, or read anywhere, anything concerning the uses of cotton seed. We were aware personally that in some parts of India the seed is sometimes used to feed goats with, and that it occasionally forms part of the buffalo's food. But we are not aware that the seed is put to any other uses in India. The following, which we take from the *Gardener's Chronicle* of the 26th ultimo, will give some idea of the uses of cotton-seed in America :—

"It is well-known that cotton-seed is, as an article of commerce, a comparatively modern introduction. Not many years since the seed, which was produced in such abundance in the cotton plantations of America was, not only a waste product, but one which the growers scarcely knew what to do with. Of late years the oil has been expressed in continually increasing quantities, and applied to a variety of useful purposes, not the least important of which is its substitution for olive oil, for cotton-seed is now purified so carefully that the result is a clear, bright, limpid oil, equal in appearance, if not in taste, to the best oil obtained from olives. Mills for the expression of cotton-seed oil have been erected in America in increasing numbers of late years. In 1870 there were only 26 mills, and in 1880, 47, six of them in New Orleans. At the present time these mills are scattered throughout the South in all the important cotton centres on the rivers and on the railways, and number 108 in all. The average yield of seed is about 3½lbs. to every lb. of lint. The amount of seed annually crushed in the United States averages about 420,000 tons. A ton of cotton-seed yields 35 gallons of crude oil, 22lbs. of cotton, 750lbs. of cake of average value of 19 dollars, making the total value of the cotton-seed product of the South 8,000,000 dollars, or 3 per cent of that of the cotton crop. Cotton-seed cake—the residue of the seed after the expression of the oil—is used chiefly for stock feeding and fertilizing purposes ; it is generally ground into a meal known as cotton-seed meal. Most of that used for feeding purposes is shipped to this country, where it is extensively used for fattening stock. It is also said to be a splendid food for cows, causing a rich and plentiful flow of milk. The cake is shipped from America in sacks containing 200lbs. each ; it is of a rich golden colour when fresh, and has a sweet, nutty, oleaginous taste. It is a very valuable fertiliser for a large number of plants. The oil from cotton-seed has been applied to a variety of uses in America, such as the manufacture of the finer kinds of soap ; also for mixing with paint, and for lubricating purposes ; it, however, dries too slowly to be valuable for the first purpose, and is too gummy or sticky for the second. Another product is glycerine, but this manufacture has been but little attended to as yet. One gallon of crude oil will make 3½lbs. of glycerine. Its chief use, as before stated, is as a substitute for olive oil, and the following extract will show the state of perfection in which the oil is now prepared :—' It is nearly impossible to detect good cotton-seed oil from the best brands of olive oil by taste, smell, or any other process : this the olive growers of Italy have been unwillingly compelled to acknowledge. An instrument called the oleometer has been invented to distinguish between the two oils by means of their different specific gravity ; but this is confessedly an uncertain and unreliable test.' The hulls or shells of the seed are used as fuel to drive the oil-expressing machinery ; and containing some oil, they burn well and produce a good heat, and are used exclusively wit[illegible] fuel. It was recently stated in America that before long cotton-seed would yield all the grape-sugar demanded by the commerce of the world. It is estimated that, 'if all the seed produced was used and crushed, this little article, once despised and deemed of no value, would be worth between 80,000,000 and 100,000,000 dollars annually.' "

Here is surely a large field for India to enter into competition with America. After a perusal of the foregoing, our Indian economists will perhaps turn their attention to a hitherto undeveloped industry. From the last Annual Statement of the Trade and Navigation of British India (1884-85), we find that the total exports of cotton amounted to 5,066,057 cwt., or 253,302 tons, valued at Rs. 13,28,63,673. Of this the several Presidencies gave the following figures :—

	Cwts.	Value in Rs.
Bengal	288,976	68,82,004
Bombay	4,064,609	10,88,52,143
Scind	71,660	17,45,986
Madras	557,877	1,34,72,806
British Burmah	82,935	19,10,674

From the Monograph on cotton cultivation in the Punjab, recently issued, it appears that 84 per cent of the whole yield of the province is locally consumed. Taking this as a basis for calculation, we arrive at the conclusion that the quantity of cotton exported only averages 16 per cent of the total yield of the entire peninsula, including British Burmah. Assuming therefore that 84 per cent of the seed yielded is retained for local consumption, and taking the calculation given in the Monograph referred to above, that the proportion of seed to cotton is two-thirds, we have for disposal 506,604 tons of cotton-seed. The quantity of seed annually crushed in the United States averages about 420,000 tons, which yields a revenue of 8,000,000 dollars, or 3 per cent of the cotton crop. Therefore 506,604 tons of seed would represent 9,649,600 dollars, or, reckoning at the rate of Rs. 2-8 to the dollar, we should have a revenue from cotton-seed alone of Rs. 2,41,23,800, which at present is entirely lost to the country. In making these calculations, we have taken only 16 per cent of the yield of the country, taking the yield and consumption in the Punjab as a basis for the whole of India. It may, however, be stated, without fear of being contradicted, that this represents a very small proportion ; as it is not to be supposed that 84 per cent of the seed is actually retained for local consumption and sowing. Our estimate may therefore be regarded as very low.

In no trade returns of India have we come across cotton-seed as forming an item of export or import, nor have we seen any allusion to it as an article of commerce. In the Punjab cotton Monograph referred to in this paper, it is stated that the labourer employed to separate the cotton from the seed, "is commonly paid by receiving the cotton-seed which he extracts :" and the only use to which the seed is put would appear to be the feeding of goats and buffaloes, and this, so far as we are aware, only to a limited extent. We have sometimes seen the seed used for illumination purposes. Earthen pans, 4 to 6 inches in diameter, are filled with the seed ; the common "sweet" oil is poured over it, and the whole d, burns with a fitful sort of blaze for a couple of hours or so.

That cotton-seed opens a wide field for the development of a profitable industry in India must be admitted. It is therefore to the owners of oil-presses and capitalists in particular that we address ourselves. We see no reason why it should not prove as profitable in India as it has in America. The Government of India have turned their attention to the development of various industries in this country—fibre, wheat, cotton, ensilage, &c. We hope they will add another to the list—the extended use of cotton-seed.

CATTLE, HORSE, AND AGRICULTURAL EXHIBITION AHMEDNUGGER.

We have received a prospectus of the cattle and horse show, Agricultural Exhibition, and a plough match, to be held at Ahmednugger on the 17th November 1885, when it is expected that about Rs. 3,000 will be distributed in prizes. It is noticeable that prizes will only be awarded to exhibitors who live in the Ahmednugger district. Horses which have been formerly shown at the Sarun show will be allowed to compete for the prizes allotted to horses. The following rules have been published for the information of intending exhibitors :—

Any taluka which gains a general prize in any class will not be eligible for a taluka prize in the same class.

Two prizes will not be given for the same animal or product.

Exhibitors of grain, seeds, pulse, cotton, fibres, tobacco and jagri must exhibit the minimum quantities stated in the prize list, and their exhibits must be placed in the exhibition room by 12 A.M. on the 16th November. Horses and cattle must also be in the yard by 12 A.M. on the 16th November. They will not be received after that hour.

Perishable articles, such as vegetables and fruits, will be received up to 9 A.M. on the 17th November.

Batta to exhibitors from the Ahmednugger district will be given under instructions to be issued to the several Mamlatdars.

The beasts will be fed at the expense of the fund during the time required for the exhibition.

The judges will decide on the merits of the exhibits in the afternoon of the 16th and the morning of the 17th November.

The show will open at 4 P.M. on the 17th November, and will remain open until the evening of the 19th November.

On the first day admission to the exhibition will be allowed to all subscribers and to their friends. No gate-money will be taken.

On the second and third days, the show will be open to the public free of charge.

The prizes will be awarded on the 19th November, after which the show will be closed.

The plough match will commence at 4 P.M. on 18th November ; entries for the match will be made on the previous day.

The following prizes are offered, but prizes will not be awarded if the committee consider that the exhibits are not satisfactory, or if there be not a sufficient number of entries for competition.

The committee will be glad to receive and allot space for any new country-made machinery and implements, and will grant certificates or award prizes for them not exceeding 50 Rupees in all.

There are 12 classes in the horse and mule section, with prizes aggregating Rs. 1,245 ; twenty-one classes for cattle, including sheep and goats, with prizes aggregating Rs. 1,177 ; under grain 15 kinds are mentioned, for which Rs. 239 are to be given in prizes, with twelve kinds of pulse, having Rs. 79 for prizes. There are nine species of oilseeds mentioned, having an allotment of Rs. 72 for prizes. Vegetables include the largest number of species, there being no less than 36 varieties. Betel-leaves, turmeric and tamarind fruit come under this head, for which Rs. 127-8 are set apart for prizes. Under fruit 22 species are named. "Green eatable Indian corn" is included among 'fruit.' This is the first time we have heard of Indian corn being classed as 'fruit,' but "circumstances alter cases," and those of Ahmednugger are, perhaps peculiar. Rs. 132-8 are to be awarded in prizes under this head. Then comes the "Miscellaneous" head, which includes sugarcane, coarse sugar, tobacco, cotton, cleaned and uncleaned, ambadi, [we don't know what this represents ; the English equivalent might have been given] tag-hemp, aloe-fibre, wool, lucerne-seed, guinea-grass, and lucern-grass, for which Rs. 234 are to be distributed in prizes. Last of all come the plough matches—there are to be two. The first match is open to all ; any plough may be used, and any breed of bullocks. There are two prizes for this —Rs. 20 and 10. The other match is open only to the students of the agricultural class, Ahmednugger. The conditions are the same, except that not less than six are to start. There are four prizes, Rs. 10, 8, 6 and 4.

There cannot be any doubt that exhibitions of this class exercise an important influence in improving the agricultural condition of the people of the district where they are held. The value of exhibitions, no matter of what class, has been acknowledged by competent authorities, and we should like to see more attention paid to the inauguration of agricultural shows. There are too few of them, and at intervals too far apart. Glancing through one of our English exchanges, we find reports of no less than seven agricultural shows in one week. The advanced state of agriculture in England and America, and the great superiority of the cattle and sheep in those countries, are due entirely to competition. It is only by encouraging competition that we can hope to do any good towards the development of the resources of this country, especially in the direction of agriculture and live-stock.

Miscellaneous Items.

FOUR students of the Agricultural College of Madras, who have received scholarships from the Mysore State, having completed their course, have proceeded to Mysore to see the Dewan regarding the inspectorships which have been guaranteed to them.

CHOLERA is prevalent in parts of thirteen districts of the Bombay Presidency. The only districts, however, in which the disease is present in a severe form, are Satara, where there were 251 attacks and 91 deaths during the past week; Poona, where there were 196 attacks and 141 deaths; and Nassick, where there were 54 attacks and 28 deaths.

WE are pleased to read of the efforts of Mr. Ozanne, the Director of Agriculture, in connection with the thrashing of Indian wheat by means of steam power. The trial recently made with a steam thrasher at Nasik is regarded by the native agriculturists, so very conservative in all that relates to the tilling and improving of the soil, as "fairly successful."

THE other day eight Australian rams were sent ashore from the steamer *Nevasa* from Calcutta, and were forwarded by rail to Bangalore to Mr. L. Ricketts, Deputy Commissioner. The above lot formed part of a consignment of thirteen rams, which had been shipped in Australia for Madras *via* Calcutta for the Maharaja of Mysore, five having died on the voyage.

THE continued fall in the rupee is engaging the earnest attention of business men in Ceylon, but not to the same extent as in India. In Ceylon the largest class—the planting community—are directly benefitted by the fall of exchange, at least all who are proprietors, and this accounts in great measure for the comparative equanimity with which the public here seem to regard the existing state of things, compared to the more disturbed condition of the Anglo-Indian community.

MR. PENDLEBURY, the Traffic Manager of his Highness the Nizam's Guaranteed State Railway, has issued notices in English and the vernacular, informing native merchants and other gentlemen interested that he will be glad to see them at any time, either at his office or his bungalow, to discuss with them such measures as would, in their opinion, be likely to increase the traffic or improve the present system of working. The Traffic Manager has also invited any merchant having any grievance to complain of concerning the Railway to confer with him in regard thereto, and he promises to do all in his power to find a remedy.

A MADRAS contemporary says:—We believe Mr. McDonald of the Excise Department has gone in for brewing on a small scale, and has sent the result of his labours, in the shape of bottled beer, to the Civil and Military Club. Whether it is owing to vitiated tastes or not we don't know, but the ale did not "take" with the frequenters of that institution. One of the frequenters, however, we are told, gave the liquor a trial, probably with the Ripon-inspired object of encouraging local trade, with the result of his abjuring the use of excisable liquor altogether since. This is certainly better than the "Nile Rum" of which so much was recently said, and Teetotal establishments would do well to secure a supply of this useful panacea, as a remedy for the evil against which they are so strenuously fighting.

THE toddy question, it appears, has again been mooted in Surat. The imperious Collector who wrought so much woe on the people of Tanna, and who is popularly reported to be the chief author of the harsh Forest and Abkari rules, is now transferred to Surat.

MAJOR BOWEN, R E, the Acting Chief Engineer of the Mysore Government, has completed his tour of inspection in northern Kolar, and has ascertained that prospects have continued to improve, and that the crops are flourishing. In some localities, as in eastern Kolar, and on the eastern side of the road from Chinta-mani to Begepully the prospects are still rather gloomy, and he has had a few tentative public works opened. He has been led to the conclusion that unless the north-east monsoon fails there is now no serious cause for anxiety. Good rain is reported from Chital-droog, and all is considered safe in that district. Bangalore [illegible] rain also during last week, and now presents as verdant an appearance as Madras.

THE Madras Government having reason to believe that it would be a convenience to some members of the planting community in Southern India who desire to send cinchona exhibits to the London Exhibition, if, instead of being obliged to send such private exhibits on their own account through Messrs. King and Co., they could send them as part of the Madras Government collection now in course of preparation, the Director of Government Cinchona Plantations was requested to report whether there is any practical difficulty in the way of such an arrangement. Mr. M. A. Lawson replied that he did not "see that there can be any difficulty in arranging with private contributors to the London Exhibition that they should send their exhibits through this department."

IT is pleasant to find the effects of last spring's good harvest already appearing in the export trade of the N.-W. Provinces. The returns of railway-borne traffic for the quarter that goes up to the end of June exhibit this year a noticeable advance upon those of 1884. Of wheat alone 25 lakhs of maunds have been sent away, against some 14 lakhs last year, the average export of the quarter for the past few years having been about 16 lakhs. Oudh and Rohilcund have done the largest business in wheat, as also in linseed, the exports of which have almost trebled, thanks to the bumper crop that was gathered east of the Ganges. The increased export both of wheat and linseed has gone chiefly to Calcutta. Meanwhile people who look closely into trade will be gratified to see that six new "blocks" have been added to the return for defining with more precision the destination of the produce of the provinces. With two of these, Mysore and Hyderabad, no business is done at all. Madras and the Berars take a percentage of less than unit, and Sind, which was formerly lumped in promiscuously with the Punjab, takes 1·5. The additions are, therefore, chiefly valuable as an illustration of the perpetual tendency of Government work to become more and more complicated, though in this instance they have been made in order to harmonise with the returns of other provinces.

A SPECIAL meeting of the shareholders in the Australian Frozen Meat Export Company, Limited, was held at the office on the 8th September last, "to consider the fall in the price of the meat in England, and its effect on the operations of the Company." Sir James M'Culloch presided. The Company has overdrawn its account with the National Bank to the extent of £11,500, on which 8 per cent interest is being paid, and if the business were suspended, the Orient Company would be entitled to claim £4,700 for non-fulfilment of the contract for the conveyance of the meat. Owing to the fall in the price of meat in the London market, the margin of profit had given place to a loss, but the Orient Company have virtually undertaken to carry the meat for ⅞d. per lb. (instead of 1⅛d. as at present) so long as the price obtained does not exceed 4d., and any balance above that is to be divided equally between the Orient Company and the Frozen Meat Company. It is believed that under this arrangement the business can be carried on without loss. The directors were authorised to continue operations until the end of the year, and in the meantime an effort is to be made to induce stock-owners to guarantee consignments of meat on their own account afterwards, so that the Company may confine its operations to freezing. The chairman urged that, in view of the falling price of wool, the squatters and stockowners of Australia should combine, and send a thoroughly qualified representative to China and Japan to endeavour to open up markets there to be supplied with wool from these colonies.

Selections.

STOCK FARMING IN INDIA.

(Concluded from last week.)

THIS farm, which comprises 37,051 acres of grass land, is situated east of Delhi and Kurnal and about the same distance, 100 miles, from either; being now accessable from Delhi by the Rewari and Ferozepore railway. It was used by Government for stud and camel breeding purposes as far back as 1845. From 1854 to 1875 it was under charge of the Stud Department. But for the last 9 years it has been managed as a cattle breeding establishment worked by the Commissariat Department. I first made acquaintance with the place in 1857 during the mutiny, when I accompanied a column under General Van Cortlandt, C. B., in its march from Ferozepore to Delhi through Hurrianah. Within a year after that time, I joined the Commissariat Department, and was stationed at Delhi, where I had an opportunity of realizing the good work of this farm in breeding bulls for the improvement of the cattle in the neighbouring districts, as well as in those more remote, for I was required to purchase some 1,200 bullocks for siege train purposes,* and these I most easily obtained of the standard height of 52 inches and prescribed age of 5 years, the entire stock exhibiting very clearly the strain of the Hissar blood. Three years ago I was called upon to make a special inspection of the Hissar Farm, with the economy of which Government was greatly dissatisfied, the expenditure being very enormously in excess of the income. I found the main reasons for this to be: 1st, that sufficient stocks of dry fodder were not kept in hand to supplement grazing and to guard against fodder famines, which were said to recur every three years; and 2nd, that the cattle, some 7,000 heads, consisting for the most part of very fine and well-bred animals, were kept in a semi-wild state in very large herds, sufficient attention not being paid to weeding the stock and segregating the cows when in calf. The results of this last evil and of fodder famines during which enormous losses of stock used to occur, and the cattle become unfruitful being that the average birth of calves fell as low as one in three years per cow, and that the cost of the bullocks raised on the farm for Artillery purposes was enormous. Government sanctioned then the inauguration of a change of system under which the farm should be sufficiently stocked with fodder, to go through two consecutive years of fodder famine, and the cattle divided into small lots with a larger proportion of attendants, and I am very pleased to be able to say that, thanks to the intelligence and energy of the Superintendent, Captain Marrett, the farm is now amply stored with fodder, and the average birth of calves has been raised to 75 per cent per annum, *i.e.*, one per cow in eighteen months, with every prospect of further great improvement. In storing the farm with fodder, the drain upon the supply in the daily consumption has been very materially lessened by resort having been made to "ensilage," some 12,000 maunds of which were for the first time stored last year, and have since been fed off to the cattle. Regarding this matter I will now read you a short paper by Captain Marrett, the Superintendent of the Farm.

Notes on Ensilage at Hissar, during 1884 85.

For the first time the experiment of storing fodder by siloing it was tried at the Hissar Farm during the past year.

The fodder so preserved was of three varieties:—

(i) The coarse grass that had grown up during the rains in the lucerne gardens.

(ii) The finer grasses obtained from the Bhir or cattle pastures.

(iii) Green jowar or cherry.

The results obtained fulfilled our most sanguine expectations, as the fodder, when taken out of the pits, was found in good preservation, and was readily eaten by cattle both young and old.

(2.) Most of the pits consisted of holes dug in the ground 30' long by 10' broad by 8' deep, and a ramp or slope at one end to enable bullocks to walk down the pit was made slightly narrower at the bottom in order to obtain a wedge shape, and with a view to better compressing the grass; but pits with straight sides proved equally successful, provided sufficient care was exercised at the time of charging them to have the grass well trodden down.

(3.) The fodder, as it was cut, was brought to the pit and evenly laid by 2 men at the bottom to a height of about a foot, when a pair of heavy bullocks was admitted by means of the ramp, and allowed to walk about until this layer was pretty well consolidated; the same course was persevered with till the fodder was carried to about 6 inches above the ground level of the pit; this was done to allow for the fodder sinking on the earth being heaped upon it. The only pressure and covering the fodder received was that obtained by the earth excavated from the pit. The time usually taken to fill a pit of the above dimensions was about 12 hours, and the contents averaged from 500 to 800 maunds.

(4.) On opening these pits between 6 and 7 months afterwards, the grass was found to have sunk about a foot below the surface of the ground, and the fodder to be of a deep brown colour, full of sap, and emitting a strong pungent smell, though this did not prevent animals to whom it was offered on the spot eating it readily.

(5.) The total quantity of fodder siloed in the farm was about 12,000 maunds, and as this was only gradually expended, some pits were not opened till after 9 months, and it was found in these cases that the smell was perceptibly less; in fact there was little [illegible] smell, and this was the more apparent in pits that had been charged with the fine grasses obtained from the Bhirs.

(6.) Having noticed the fact, and with a view to still further testing the point, I had one pit charged with coarse grasses obtained from the sides of a water-course, the grass was in seed at the time, and after a lapse of 5 months we opened it and found that the grass was of a very dark colour indeed, while the stench arising from it can only be compared to rotten fish: it is needless to say that no cattle would eat it.

(7.) The experiment of leaving the fodder in the pits for 12 months is now being tried, and the result will be duly reported.

(8.) The cost of preserving fodder in this manner has been about 14 maunds per rupee. The digging of the pits was, of course a heavy item, and the fact of having many of these ready made will considerably affect the price of our ensilage this year.

(9.) The loss of weight in the fodder, at present ascertained, has been about 25 per cent, which added to the cost of storage makes the price 11 maunds per rupee.

Many of you must have had your olfactory nerves most painfully assailed by the crude efforts being made at many stations to utilize this fodder when immature, and you will hail with satisfaction the fact which this paper discloses, that, if the fodder is kept until it is mature, the truly awful smell which proceeds from it when it has only undergone a third or only half the period necessary to render it fit for use, is avoided The advantage of this system under which rank and immature grasses and crops can be stored and converted into highly nourishing fodder is incalculable to an establishment like that at Hissar. The fodder famines to which I have alluded are not, by any means, of necessity, the result of total failure of the monsoon. There may be a good rainfall from 15th June to 10th August; but if it ceases then, and dry hot weather sets in and continues for a month, you may say good-bye to the hay crop, and anticipate scarcity of food grains also from complete failure of the rain crop. But under the system of ensilage, the vegetation which springs immediately in the commencement of the monsoon, would, in such a season as that I have described, admit of any quantity of fodder being siloed during July. In fact, I consider that the farm at Hissar may, by resorting to this means, go through three or four consecutive bad years unhurt. The success which had attended the distribution of farm bred bulls, has not attended that of the fine rams raised at Hissar. The reason of this is that the villagers have hitherto obstinately closed their eyes to the necessity of preserving fodder to supplement grazing. They shake their heads when you send them a good half English bred ram, and say "how could that animal find food for himself around our villages?"

They purposely raise the miserable creatures they call sheep, because *these animals do, though how they do, it is a marvel to me, manage to get through the year with little or no addition to* the scanty grazing they pick up round the villages. If there was any foundation for the unsophisticated townsman's idea that "streaky bacon" was produced by an alternate process of high feeding and starvation, these unfortunate sheep, which for a short season during the monsoon are, so to say, in clover, would turn out highly variegated mutton. But the stuff they do produce is like themselves, the poorest of the poor. We have now enlarged our sheep-breeding operations at Hissar in view to contributing in a small way to the mutton supply for the troops at the nearest large stations, and I hope to demonstrate very soon that it pays to raise good heavy sheep by affording them good grazing and supplementing it by stall feeding; and I am very confident that the improvement in wool, both in outturn and quality, by crossing the country sheep with good English and Australian stock, will go far to ensure the commercial success of the measure. I have here some samples of wool from the Hissar

Farm, which some of you may care to look at presently. They are specimens of the wool of the imported Australian south-down, of several of the pure country breeds, and of various crosses with English stock, and it does not require an educated eye to distinguish the great improvement in the wool of the cross breeds compared with that of the indigenous stock. I may mention that our mixed wool at Hissar, disposed of on the spot, realizes a very satisfactory increase in price on the country produce. The Superintendent is now making efforts to put his wool into the export marts, and I anticipate that, with due attention to the subject, we shall obtain very satisfactory results, the industry being as yet in its infancy with us. The large quantities of natural grass which are allowed annually after every monsoon to dry up and wither in thinly populated tracts of country, and the large quantities of hay annually sacrificed in the well populated districts, by indiscriminate grazing and the non-reservation of meadow land in its due season for hay purposes, represent so much hard coin allowed to melt away every year, and a proportionate loss of revenue to the State, while the scandal, still to a great extent perpetuated, in the exercise directly or indirectly of a sort of prescriptive right to cut grass where we choose, is, in my humble opinion, a great reproach to us, and I think that it is very evident that rigid enforcement of the laws affecting trespass is called for.

I have little doubt that not only in the vicinity of our cantonments but all over the country, if proper protection existed, the cultivation of hay, which is unattended with the risk attached to the cultivation of grain crops in loss of money laid out in ploughing, seed, &c., by failure in the rainfall, would quickly be recognised by the *zemindars* as so lucrative as to justify a due proportion of their land being reserved as meadow land, but what would be the result with land so set apart as matters now stand? I certainly would not be inclined to purchase the embryo hay crop under the supposition that it *was* in the power of the owner, with all the good will in the world, to protect it for me.

As I have before remarked, I have no doubt that in a very few years, if we now do our duty, our markets will be well stocked with good hay. But we must face the fact that our dearly beloved grass-cutter with his *coorpa*, and his proverbial excess of olive branches, will disappear from the scene. Personally, I should rejoice in being thus released of several of the numerous domestics I am now forced to maintain, and professionally I have no dread of inconvenience to the service resulting from the grass-cutter being a thing of the past, either in regard to cantonment life or to service beyond our frontiers, in reference to which last, no doubt, necessity will as usual prove to be the mother of invention, and we shall manage as other nations do when they start on the war-path. If the independent princes and chiefs of India can only be got to devote attention to this subject of "Stock farming as connected with hay and other fodder farming," what an addition to their revenue they will make. Take for instance his Highness the Maharaja Scindia of Gwalior, in whose country uncultivated land certainly predominates. This land *may* not, it is true, be capable of the irrigation necessary to grain cultivation, but that is no reason why the revenue from it should be largely confined to charcoal obtained from the stunted jungle, while every year a luxuriant crop of good hay is produced on it, which if cut in its season would support stock farms for rearing horses, mules, cattle, and sheep. I have some experience of hay making in that country, and I am sure that the farmers could stack it on the spot at 12 or 14 maunds per rupee, at which rate, as regards cattle and horses, a daily ration of 8 seers per animal, which, (allowing for grazing, would be heavy) would cost, per head all round, from 5 to 6 rupees per annum.—*Englishman.*

TUBERCULOSIS.

The evidence from which it must be decided whether or not tuberculosis of the lower animals is identical with the disease of the same name in man is, as with the question already discussed, partly clinical and partly experimental.

It is to be noted at the outset that the appearance of the diseased parts in man and animals are so similar, that for a very long time the same terms, such as *consumption*, *wasting*, &c., have been applied to distinguish both conditions. Nevertheless, the morbid anatomy of the tubercular growths in some, at least, of the inferior animals, is not strictly identical with that of the same growths in man; but the differences are unimportant, and not greater than in other cases (such as splenic apoplexy of cattle and human carbuncle), where there is no doubt that we have only one and the same affection to deal with.

Cases of natural transmission of tuberculosis from animals to man are, from the nature of things, very difficult to prove. As an example, the following two cases may be cited. Dr. Bang, of the Royal Veterinary School, Copenhagen, mentions, in a learned article on tuberculosis in the udder of the milch cow, a case where a lady, who had been previously considered healthy, suddenly developed phthisis, and died within a year. During the early stage of her disease she gave birth to a child, which became tuberculous, and died within six months. It was found that one of the cows supplying the household milk had tuberculosis of the udder. Dr. Stang, of Amborsch, has recorded a case, in which a boy, previously healthy, and born of healthy parents, without any history of tubercle on either side, developed an acute attack of tuberculosis, and died after an illness of four weeks. It subsequently transpired that the boy had for a long time been fed on milk from a tuberculous cow. Many similar cases might be cited. These, however, may suffice as a sample of what, it must be conceded, furnishes strong presumptive evidence that animal tuberculosis is transmissible to man—that in fact, the two diseases are identical.

It will readily be understood that even if the diseases are the same, cases of transmission from man to animals are likely to be extremely rare, and that when they do occur they are very likely to escape observation. Passing over this then, we come to the evidence afforded by experiment, of which there is no lack. It has been abundantly proved by numerous observers that the sputum expectorated by consumptive people, and tubercular matter taken from the bodies of such persons after death, possess the power of setting up tuberculosis in animals almost with certainty, when injected under the skin and in a large proportion of cases when introduced into the stomach with food, or when dried and disseminated in the air, that the animals are compelled to inhale. Tuberculosis so set up differs in no respect from tuberculosis naturally contracted. It is hardly necessary to say that there can be no experimental evidence proving the transmissibility of tuberculosis from animals to man, but without this, it must be admitted that there is complete proof of the identity of human and animal tuberculosis.

In 1881, Koch, the illustrious German, who has done so much to further our knowledge of the cause of infective diseases, showed that tuberculous matter, whether taken from man or animals, contain peculiar minute organisms, or bacilli. By elaborate experiments he was able to isolate these organisms, and to cultivate them in artificial substances. With minute quantities of a pure cultivation of this nature, Koch was able to produce tuberculosis in many different species of animals, and the result he found was always the same, whether the original material was derived from man or animals. Koch therefore concluded that he had discovered in this minute organism the cause of tuberculosis, and the explanation of its contagious and transmissible character. At first his statements and conclusions were received in many quarters with scepticism; but as the result of confirmatory investigations by a great many eminent authorities, it is now all but universally believed that Koch's bacillus is the actual cause of tuberculosis.

The bacillus of tuberculosis is a minute organism, having the form of a short rod, sometimes beaded, and at other times plain. It multiplies by growing in length, and then dividing across, and also by the formation of spores. These spores appear in the rod as minute bright specks, and when the rod breaks up, the spores grow into new rods. The rods are killed with comparative ease by boiling, &c., but the spores are killed with great difficulty. The bacillus belongs to the same family of living things as the organism which is the cause of swine fever, and that which is the cause of splenic apoplexy. It has, however, some peculiar characters, which go far to exlpain some important points in the pathology of tuberculosis. One of these—and it is one of great importance—is the fact that the bacillus of tuberculosis is incapable of multiplying outside the animal body, except at temperatures approaching blood heat. Another peculiarity is, that the growth and multiplication of the bacillus, even when kept at the most favourable temperature, take place very slowly when compared with the rate of growth of other disease organisms. These peculiarities of the tubercle bacillus appear to afford an explanation of why tuberculosis, although contagious, is much less so than, for example, glanders or pleuro-pneumonia; and they also serve to explain the slow rate at which the disease develops in the animal body.

It has for a long time been known that both among human beings and among animals, there is a strong hereditary tendency to tuberculosis, and also that such predisposed individuals have certain peculiarities of shape and build, that mark them out to even ordinary observers. It seems possible to explain the hereditary tendencies of the disease in two ways. In the first place, it is beyond doubt, that the tubercle bacillus itself may pass from the mother to the offspring, which may thus be the subject of tuberculosis at birth; and in some cases, what passes for hereditary tendency is not a mere tendency, but a manifestation of the actual disease. But in the second place, it would appear that there is a kind of consumptive constitution, the possessors of which are peculiarly liable to contract tuberculosis, where other individuals would resist the onset of the disease. And it is not far fetched to suppose, that beneath the obvious peculiarity of a consumptive build, there are in the fluids and tissues of those predisposed to consumption, certain special characters, beyond the reach of chemical or microscopical research, that render these fluids and tissues a more favourable soil for the growth and development of the tubercle bacillus, than the fluids and tissues of ordinary individuals. As bearing on this point, it may be mentioned that Koch has shown that a particular bacillus invariably produces blood-poisoning when inoculated into ordinary house mice, but that it is quite harmless to field mice.

There has now been passed in review as much of the history of tuberculosis as may enable one to form an opinion on the following all important questions:—1st. Is it in the interests of the stock owner and of the community that tuberculosis should be made subject to the regulations that apply to the diseases already embraced within the Contagious Diseases (Animals) Act? 2nd. Can the flesh or milk of tuberculous animals be used as articles of food without risk to the consumer.

To the first question, we think that the evidence directs an affirmative reply. In the interest of the stock owner, and in the interest of the community, who are benefited by all that fosters the well-being of the food supplying animals of the country, it is desirable that every tuberculous animal should be slaughtered, adequate compensation being, of course, awarded to the owner. In this connection the curability of the disease hardly needs to be discussed. All authorities are agreed that we know of no cure. It is not denied that recoveries do take place; but they are extremely rare—more rare, without doubt, than in cattle plague or pleuro-pneumonia. And then it must not not be forgotten that as long as a tuberculous animal lives, it is a menace to its neighbours, since it is surely though unobtrusively disseminating the living virus of the disease.

To the second question all the evidence proclaims an unhesitating No. There must be no half measures. It is not a question of how much of the carcase of a tuberculous animal is hurtful. In acute tuberculosis it has now been proved that the blood, and therefore the entire animal, contains the organised poison—the bacillus. Nor let it be supposed that cooking can be relied on to destroy, this poison. Animals have been experimentally fed on roasted tuberculous flesh, with the result that they soon became the subjects of the disease. The same arguments apply to the consumption of milk from tuberculous cows. The milk of such an animal may not always contain the poison, and even when it does, it may not contain it in sufficient quantity to affect a robust person. But that has no bearing on the question. It is enough to know that such milk very frequently does contain the poison; and that it can never be pronounced free from danger, even when its characters are apparently quite normal. There must always be a risk of setting up in the body of some of its consumers a most incurable malady: from this risk the public should be protected.—Vet. Ed.—*North British Agriculturist.*

TUBERCULOSIS IN CATTLE.

Sir,—There are a few remarks in the letter of '*J. H.*,' published in your last issue on the above subject, which I can scarcely allow to pass unnoticed. In view, however of the able article on tuberculosis in the same issue by your Veterinary Editor, an extended notice thereof is rendered unnecessary. Without referring to the quibble underlying the remarks in the first two or three paragraphs of your correspondent's *advised*, and shall continue to advise, *that all tuberculous animals be slaughtered, and their carcases destroyed*; in other words, *the destruction of diseased animals and their carcases* is one of the suppressive measures I would have carried out. Putting 'the veiled power of the Divine Framer' aside for the moment, I adhere to the statement made in my last, as to the incurability of tuberculosis, and further say that neither '*J. H.*' nor any other living man can bring forward proof that an animal, once the subject of the disease, has been so fortunate as to get rid of the products thereof from its system, and become again a *thoroughly healthy* animal. I cannot see anything like a line of demarcation in the admission made by me, that the disease sometimes becomes quiescent, inasmuch as it has been shown over and over again, by direct experiment, that not only fibrous tubercle (grey nodules), but even *obsolete* tubercle (*i.e.* tuberculous products having undergone calcification), is extremely virulent, when introduced into the system of another animal, either by inoculation or ingestion; and can 'J. H.' guarantee that every particle of tuberculous matter will be removed by the flesher from the carcass of a consumptive animal before it is exposed for sale, as food for man? Perhaps he has not seen, as I have, dozens of carcases with tuberculous deposits about them so exposed, and in some cases the flesh prepared for the mincing machine, preparatory to its conversion into sausages or other similar delicacies. 'Butchers,' says 'J. H.' 'butchers could tell a startling tale of how many *meningeal* tuberculous, and other deposits they find in and on animals slaughtered for human food.' Doubtless they could, but they take good care to conceal these facts, and I would ask '*J. H.*' how many *meningeal* growths are detected by the butcher, seeing that the skull is always smashed through, and a part of it removed with the hide, and the brains scattered about in the process of dressing. But, putting all this argument aside, the real question to be answered is this:—Would 'J. H.', or any one else, knowingly elect to eat flesh from a consumptive animal? or, if his taste is so depraved, would he if he had the carcase of such an animal for sale, ticket it *as the flesh of a consumptive animal*?

'J. H.,' questions the infective nature of the disease. Was he acquainted with the late Mr Dewar of Midmar? If so, he may know that that gentleman placed on record during his life several positive facts in proof of this, and similar facts have also been recorded by Grad, and a host of other veterinarians. In reference to the consumption of milk from tuberculous animals, I envy the composure of your correspondent, but I would be sorry to share his relish. Lastly, it might be beneficial to all concerned, if he would explain the signs, to which he refers, of tubercular liquefaction, and teach us at the same time how we are to detect small tubercles in the glands of the udder.—I am, &c.

Thomas Walley

Royal Veterinary College, Edinburgh.

—*North British Agriculturist.*]

OPIUM vs INDIGO.

Another and a novel phase of the private enterprise question is likely before long to occupy public attention. In this case Government is not competing with private capital in the same field of industry; but a Government monopoly is colliding with an interest which is entirely in private hands. The cultivation of opium is interfering with the production of indigo, and the question is whether one of these products must go to the wall, or whether there is any way of accommodating the difficulty. Within the past few years, indigo cultivation has spread extensively in all the north Gangetic districts of Behar, where opium has long been a staple crop. The competition for good land has thus become very keen, and consequently the value of land has greatly increased. The pressure of the Behar population on the land, which the last Census Report places at 637·03 per square mile, has also tended to complicate matters. Looking to the limited quantity of good land, and the steady expansion of indigo culture, it is difficult to see how matters can be arranged unless by allowing one crop to trench upon the other. The question of growing the two crops in rotation on the same land is one of great importance, and in the course of a Resolution which is before us, Sir Rivers Thompson makes the following remarks on the practice of sowing indigo on poppy lands:—"The custom of sowing the two crops has prevailed for some time in parts of Sarun, Tirhoot, Chumparun, and Chupra. Well-to-do and independent ryots, Mr Kemble states, might and do with advantage to themselves grow both crops. But they have to work hard to prepare their land for indigo after the poppy has been gathered, and they, therefore, seldom or never get a second cutting from their indigo. When, moreover, the ryots grow indigo directly under advances from the factory, complications are likely to arise if they attempt to cultivate both crops." The opium crop is collected in March, just about the time of the indigo sowing, and therefore the ryot who intends to grow both crops would certainly have to work hard to get his land ready for indigo after the poppy crop was gathered.

This is the *khuski* system, according to which the ryot grows the indigo on his own account, and takes it for sale to the factory, and if this system were more generally adopted, it would probably lead to an improvement in the relations between the two industries. The Government on behalf of the opium interest, is strongly opposed to the lease or farm system, which prevails to a much larger extent, and by which the indigo planter gets the lease of a village for a certain number of years, and utilises the best lands for sowing his crop. What is known as the *pathi* rule is greatly in vogue, by which a percentage of about two or three cottas in every bigha of jute is taken from each ryot, and either a deduction in his annual rent is made for this *pathi* land, or a rent is paid to him for it. On behalf of opium, we are reminded that it is the older crop, and that it has usually been cultivated on the best available lands. The Government does not see the right of the young and vigorous rival to push its way at the expense of the earlier occupant of the land. This is looked upon as unjustifiable intrusion, and it is implied in the Goverament view of the case that the planters are guilty of some undefinable offence in treating the question as a matter of business. It is no doubt unfortunate that the two industries should clash in this way, and the result will [illegible] favourable to opium alone. But it is preposterous to set up any special claims for the protection of the Government monopoly. The Government in its industrial ventures must be prepared to meet the risks and chances to which all such ventures are exposed, and must be ready to recognise the fact that there is no royal road to success in business. Already there has been a good deal of avoidable interference with private enterprise in various directions. The coal sales of the East Indian Railway, are still attracting attention, and the whole question of jail industries yet remains to be placed on a permanent basis. It is, therefore, to be hoped, that, with all due respect to the exigencies of the opium revenue, the Government will not act in an arbitrary spirit in its dealings with one of the principal independent industries in the country.—*Englishman.*

HOW TO GET THE MOST BUTTER.

There are several things which affect the yield of butter from a cow of any kind. First, the food of a cow affects it; second, the manner of setting the milk chiefly in regard to the time which it requires for the cream to rise; and third, the temperature at which this cream is churned.

It has been shown by many careful experiments, and by the results of long practice, that succulent food helps to produce *a large quantity of fat in the milk*, and also has such an effect upon the same as to cause the cream to separate more completely from the milk, leaving less fat to be lost in the butter milk. Hence, the use of ensilage, or what is better for most farmers and easier to accomplish, the feeding of roots of an unobjectionable kind, such as mangels or sugar beets in the winter, and the use of some kind of meal, preferably a mixture of corn meal and coarse middlings, with pasture in the summer. In winter, the use of cut hay or fodder, moistened with boiling water, with which the meal is mixed, is better than dry hay or fodder. Further, it has been found, that when the milk of the whole herd has been mixed together, and when the milk has been set for 36 hours, and the cream churned at the end of 24 or 36 hours more, the largest product of butter was obtained. When these periods are shorter or longer, the character of the cream differs, and there is a loss of butter in one or the other of the settings or milk or skimmings of cream. Hence it is most profitable for a dairy to consist of as many cows as will supply cream enough for a churning at one milking, and to churn the cream of one milking by itself. Lastly, the temperature of the churning is of importance, both as to the time of churning and the quality of the butter made. An example from the records of Houghton Farm in regard to this point will be exceedingly instructive, and they fully accord with a great number of tests made by the writer during several years past. At Houghton Farm, when the whole milk of a cow (Clover) was churned at a temperature of 74 degrees, somewhat more than a half of the butter was obtained, while at one time actually less than half of the butter was the result, and it required three and sometimes four churnings to procure all the butter. On the other hand, when the cream was churned at a temperature of sixty-two degrees, all the butter was obtained, or in one case only from one and one-eighth ounce to two and a quarter ounces from about forty pounds of milk remained in the buttermilk, and was procured at a second churning. As double or treble churning is manifestly impracticable in a business dairy, and is troublesome anywhere, it is very important to observe every necessary precaution in regard to the temperature of the churning. In the writer's dairy, the regular winter churning temperature was kept at sixty-two degrees, while the summer temperature was fifty-five degrees. The temperature at which the milk is set and the cream is kept, should also be uniform so that the character of the cream is always the same. It may be thought that a few degrees in the temperature of the cream is a small matter; but great results depend upon small things in all human affairs, as well as in nature; and if a dairyman would succeed in his business, he must observe carefully all these small things.—*American Agriculturist.*

"THE EXODUS OF BONES."

TO THE EDITOR.

Sir,—The letters from Mr. D. B. Allen and "L. L." which have appeared in your columns on the above subject have no doubt been widely read by numberless persons interested in the agricultural prosperity of India, and [illegible]. I therefore wish to submit a view of the question which has been apparently overlooked by both the writers in their zeal for the welfare of the country.

The bones exported from the country bear but a small proportion to the supply available,—a supply which has existed for untold years, and which has hitherto, I venture to say, been entirely wasted. For the custom is for dead cattle to be dragged and for drying cattle to be driven to pieces of waste land, perhaps the sandy shore of a river or some corner left uncultivated for the purpose, where their bones remain after the *chamars*, dogs, and vultures have each taken their share. A bone or two may be occasionally dragged into a field, but the effect of such waifs and strays can barely be appreciable. Every village has then its Golgotha, from whence the bone collectors get their supplies; for, considering the price of the article, it would not pay even these men to search from field to field for single fragments. They take from a collection, or leave the trade alone. Under these circumstances the export can have, I submit, no appreciable effect on agriculture. The bones would, if left, enrich one small piece of ground inordinately, and be of no benefit even to the adjacent lands, much less to the village at large. I conceive this argument is borne out by the fact that the export of bones is a trade of comparatively small extent and of recent development, while the accumulation of bones and their decay and dissolution have been going on for centuries, and yet Mr. Allen points to the want of phosphorus in the soil and alleges the lands are deteriorated,—a want and deterioration for which I think other causes may be found than in the Export Returns.

To attempt to stop a trade which is distinctly a benefit to the English consumer, the exporter, and even the humble collector, for a problematical waking up of the Indian ryot to the advantage of using a material he has neglected for so many hundreds of years, and which has not benefited him in any way, is a strange and barbaric policy to advocate in these days, and surely a misnomer to term Conservative. It might, if the argument were pursued to its logical conclusion, be held right to forbid the export of oil-cake, as it is a valuable manure, or horns and hoofs most valuable for the same purpose, or in fact any other material which, though neglected by the ryot for manurial purposes, is valued elsewhere.

With thousands of tons of manure, such as sweepings and stable litter, which caste prejudices would not debar the use of, and yet year after year carried to the Salt-water Lakes and wasted round Calcutta itself, where enlightenment should be found, if anywhere, the use of which would be repaid tenfold in growth of vegetables which would find a ready market, it is idle to talk of opening the eyes of zemindars to the loss the country sustains in the export of bones. Let the Agricultural Department show practically their value, and if the zemindar's eyes are to be opened, that plan will have more effect than reams of correspondence in newspapers only, read by enlightened people who do not need to be told what they already know.

I allude to zemindars, as that class is apparently to be appealed to, though in my experience, zemindars, as a class, are supremely indifferent as to whether a ryot gets a good or bad crop, as long as he pays his rent and various "squeezes."

D. B.

—*Englishman.*]

Holloway's Ointment and Pills will be found the best friends to persons afflicted with ulcerations, bad legs, sores, abscesses, fistulas, and other painful and complicated complaints. Printed and very plain directions for the application of the Ointment are wrapped round each pot. Holloway's alterative Pills should be taken throughout the progress of the cure, to maintain the blood in a state of perfect purity, and to prevent the health of the whole being jeopardised by the local ailments; bad legs, old sores and grievances, are thus readily cured, without confining the patient to bed, or withdrawing from him or her the nutritious diet and generous support so imperatively demanded, when weakening diseases attack advanced years or constitutions evincing premature decrepitude.

NEW POISON FOR POTATO BUGS.

Passing through the country on the railway we have recently seen numbers of farms where people were busily engaged picking potato bugs off the vines. At a little place in north western Iowa, we had a talk with a druggist about the matter and learned from him that large quantities of Paris green are purchased from him every day. "Just this morning," said he, "I sold six pounds to one man, and am sure it will hardly pay him to use it." We suppose large quantities of this poison and also London purple have been used this summer with little or no avail, but here comes a writer in *Vick's Monthly*, and claims that he has a successful remedy in the shape of the perennial larkspur. He says:

"Last summer after planting my borders and flower-beds, I had some odds and ends left, among which were about a dozen plants of perennial larkspurs (*Delphinium formosum*). I planted all in a row alongside of a potato field. Every potato grower knows that no matter how carefully and persistently he applies his Paris green, when the vines are down there are always some bugs left to supply us for the next season. When there are no more potato vines for them to eat, they go for tomatoes, peppers, egg plants, and others belonging to the Solanum tribe. One day when passing my larkspurs above mentioned, I was astonished to see the ground under them covered with dead and half dead and nearly dead potato beetles. Some were on the plants, and of course, I watched them. My observations satisfied me that none of those who trespassed on my delphiniums lived long enough to have a taste of the tomatoes in the next field. There was no apparent injury done to the plants that killed them; but how did they get killed? My theory is that after leaving the potatoes they crawl up everything that comes in their way until they find something that suits their palate, but that even nibbling at larkspur is too much for a potato bug. Perhaps some who read this will experiment on a large scale the coming summer. I certainly shall if the seeds I plant do not disappoint me."

We have never seen the above plant grown for the purpose named, would but strongly advise our readers to give it a trial. The larkspur is a pretty plant, and if it does no good as a bug preventive, may be used as an ornament. It can at least do no harm.—*Farmers' Review.*

THE NORD-DEUTSCHE JUTE SPINNEREI UND WEBEREI.

We are indebted to a friend for the following interesting account of a jute spinning and weaving mill at Hamburg, which has been furnished by a correspondent of a Dundee paper:—

During a short visit to Hamburg last month, I had an opportunity of seeing a large jute mill there, and as Dundee is largely interested in everything connected with the industry, the subjoined notes may not be unacceptable to your readers. Two years ago a Limited Liability Company, called the Nord Deutsche Jute Spinnerei und Weberei, Hamburgh, was formed, with a capital of £80,000, which has since been increased to £120,000. About six acres of ground at Schiffbeck, on the Bills, seven miles from Hamburg, were bought, and extensive works were erected. The buildings are all of one storey, have a frontage to the river of 600 feet, and are 300 feet wide. When the establishment was opened in January last year, there were 128 looms and 2,700 spindles, but the demand for goods was so great that additional machinery was soon required, and there are 240 looms, with 400 spindles, in operation at present. The buildings were set down for 320 looms and 5,000 spindles, so that there is yet considerable room for extension; but if the same progress is made in the future as has been done in the past eighteen months the whole accommodation will shortly be required. Between 750 and 800 hands are employed, and the quantity of cloth turned out is about ten tons per day. The works are fitted up exactly on the same principle as those of the best factories in Dundee, and, in fact, a good deal of Dundee machinery is used. The whole of the machinery in the spinning department was made by Messrs. Lawson, Leeds, while the rest came from the works of Messrs. Robertson & Orchar and Parker, Dundee. At first sight the distance of the works from Hamburg might be considered a disadvantage, but a little consideration shows that it is not so. Labour is cheaper at Schiffbeck than at Hamburg, and by having the works placed beyond the boundary of that town the manufactured goods can be sent to any part of Prussia free of duty. That of itself is a great advantage, for had the factory been in Hamburg a heavy duty would have been leviable and the Company would have been unable to compete with British manufactured goods on so favourable terms as they can do under existing circumstances. The raw material is either imported direct from Calcutta or bought in London. On reaching Hamburg it is transferred to barges in which it is carried to landing-stages opposite the works, and thence by tramway to the warehouses and preparing departments. It is unnecessary to describe at length the processes by which the jute is manufactured into cloth, but it may be mentioned that hand-batching is preferred to that done by machinery. After being batched the jute goes through the preparing, spinning, winding, and dressing processes till it is ready for the loom; and the quality of cloth turned out will stand comparison with that produced in any similar establishment either in Dundee or on the Continent. None of the cloth is exported, the whole being consumed in Prussia. Unlike the Dundee mills, many of which are working short time, the Nord Deutsche, in order to overtake orders on hand are obliged to work overtime. The working hours are sixty six per week—from six o'clock in the morning till seven at night—and when I was there part of the machinery was kept running till eight o'clock. The operatives, with the exception of a dozen Scotch spinners and weavers, are Germans. All overhead the average wage is from 10s to 11s per week, spinners receiving from 9s to 12s; winders, from 12s to 15s; and weavers, from 14s to 18s. Although the hours of labour there are ten per week more than in this country the quantity of work turned out is about the same as with us. There are various causes to account for this, two of which might be mentioned. In the first place, a Scotch hand is superior to the average Continental workman, and does more and better work than the latter: secondly, a good deal of time is lost by the employés staying out on Mondays. The wages are paid once a fortnight, and it is not uncommon for from 150 to 200 hands to fail to put in appearance on the Monday after pay Saturday. In fact, I [illegible] on a Monday and the manager told me that on that occasion 200 of his employés had come in. Many of the workers, he said, are quite listless on Tuesday, and it is not till Wednesday that everything is in full working order. The Germans go in for enjoying themselves on the Sunday, and the result is that many of them are unfit or unwilling to work on Monday. Near the works there is a large park—a very popular resort of the workers. Amusements of various kinds are provided. Many of the frequenters dance all Sunday night and up to six o'clock on Monday morning. Little wonder need be felt that they are disinclined to commence work. The factory is lit with gas made on the premises; and there is a fire brigade connected with the works, consisting of 20 members, with Mr. John Cargill, the manager, as captain. One part of the buildings is used as a dining-room, and 450 persons daily take advantage of it. Provisions are supplied by a merchant who has also charge of commodious premises belonging to the company in which about 200 of the hands are lodged and boarded. For the benefit of the Scotch workers a presbyterian service, conducted by the Rev. Mr. Atkinson, minister of the Reformed English Church in Hamburg, is held in the manager's house every alternate Thursday evening. I attended one of the services, but was rather disappointed to find that of the eighteen or twenty who were present, only five were workers. In explanation of the small attendance it was stated that a number of the girls were unable to be present, being engaged working overtime while the meeting was being held. It may be mentioned that two commercial directors connected with the Company—Mr F. Friedmann and Mr. Max Meyer—were at one time engaged in business in Dundee.

KEEPING MILK FRESH.

This is a subject which has caused the dairyman and general farmer much trouble. Even with the greatest precautions; milk-coolers, ice, well-water, running water, and cool cellars, he has found that in certain conditions of the atmosphere, it is almost impossible to keep milk sweet and fresh. Not only has this difficulty been experienced in keeping milk, but also in preserving meat and other articles of food in a healthy condition for human food. We have recently heard of many cases of poisoning from the consumption of dried beef which had been tainted while in the butcher's hand, and from this cause some deaths have occurred. This being the case, it would be a boon to farmers and others were some reliable preservative invented to keep milk and other commodities fresh. An English exchange offers a recipe which seems to promise good results, and is at least worthy of experiment. This compound has been named "Glacialine" by the inventor, who claims that it will preserve meat and fish, poultry, game, eggs, butter, milk, cream, and also vegetables, fruit, fermented liquors and other substances, and liquors affected by age, by an increased thermal condition, by changes in the state of the atmosphere and otherwise. It consists of a combination of water, hydric borate, sodic diborate, glycerine, and in some cases white sugar, nitrate of potash and common salt. These ingredients may be compounded together in variable proportions relatively with each other, but it is preferred that the following proportions be employed as best suited for the purposes of this invention, *viz*, in each gallon of pure water, and which is employed at atmospheric temperature are dissolved of

	Avoirdupois.
Hydric borate	9 ounces.
Sodic diborate	4½ ounces.
Glycerine	4½ ounces.
White sugar	3 ounces.

Or the sugar may in some cases be dispensed with. This liquid preservative is especially valuable in that it consists in a large proportion of hydric borate, obtained in a solvent or liquid state, the said substance being rendered much more soluble and more efficient by means of the other antiseptic ingredients, above mentioned.

Any druggists will be able to compound the above preparation from the recipe given, and we should think that every farmer will find it valuable. Common boracic acid, finely powdered, can also be purchased of the wholesale druggists, and may be used with impunity, being tasteless and harmless, and an excellent preservative of milk.—*Farmers' Review.*

HOP-PICKING AND HOP-PICKERS.

To dwellers in the north we suppose a hop garden is almost as novel a sight as a vineyard. And, indeed, there are many persons who consider it quite as picturesque, especially when the hopbines are twined round strings stretching from the tops of tall poles, so that the visitor walks beneath a beautiful web of greenery from which hang the lovely clusters of hops. The other and more old-fashioned method is also eminently picturesque. The poles are *still taller*, and are placed in groups of three on little "hills;" the bines are trained up the poles, the tendrils interlacing with one another, the bunches of flowers mingling with leaves until each group forms quite a little bower. There is an average of 1,210 of these groups to an acre.

To numbers of people the hop-picking season, which usually begins in the *early days of September*, is a joyful, healthy holiday, the attractions of which are simply irresistible, especially as the light labour enables many a poor peasant and half-starved East-ender to obtain a little store of cash, as well as health and pleasant memories for the dark days of winter. But there is no thought of winter in the rich mellow September sunlight, lying so warm and still on the long line of broad-leaved hop plant, with their golden, healthy-scented flowers! The sky is clear, the autumn wind is scarcely felt, the laugh of women and children rings merrily out, jests and good-humoured "chaff" abound; here a song is lightly sung, and everywhere is cheery chat, as pole after pole sways hither and thither in the sunlight, its bine is broken, and finally it is thrown across the sackcloth bin, where busy fingers soon strip off its yellow treasure! This is hop-picking at its best. Of the wet days that darken the scene, of the excesses that sometimes disgrace the pickers, let others tell! Such a chance of combining business and pleasure, of mingling healthy labour and holiday delights, is not to be lost sight of; and from the squalid courts and alleys of the great metropolis, as well as from the quiet little cottages of the country village, some thousands of poor folk every year look forward with joy to 'goin' 'oppin'.'

Formerly the poor folk used to tramp down the long country roads from London, or they would crowd into some ricketty conveyance and journey along in as dignified a manner as possible by donkey-cart, or behind a bony horse. But now the railway companies run special cheap hop-pickers' trains, which are largely patronised. The departure of these trains is a sight worth seeing. Women and children in, one might say, almost every stage of poverty, rags and dirt, and burdened with very nondescript baggage, mainly crowd the platform in the grey, chilly morning light. There are a few men slouching about; but many of these have preferred to tramp off along the road and save the scanty fare, leaving the women and children to come by train with the luggage. And such luggage! Pots and pans, kettles and teapots, loaves and potatoes, all crammed together into a worn-out sack or broken basket. Here is a poor woman with a bundle of bedding, a baby in her arms, and another dragging at her ragged skirts; there is a boy with an old clothes basket of crocks and pots and meagre provender. But at last the porters and the guards coax and command the motley crowd to stow themselves into the carriages, and then, as the first faint rays of dawn are flushing the sky over the Thames, the heavily laden train steams slowly south. To watch the departure of a Scotch mail for the moors and then shortly after to witness the hop-pickers start for their holiday of light labour is not the least striking of the many striking contrasts that mighty London has to show.

Arrived at the station, the hop-pickers straggle off one after the other along the hot, dusty roads to the gardens of the grower from whom they hope to obtain employment. The poor people have often a long and tiresome journey, though no doubt some of them enjoy the pleasant change from the hard pavements of town. But after a time the bundles become very heavy, the children get tired, and the sun is hot. Nevertheless, they struggle along somehow, and perhaps a kindly waggoner will give them a "lift." Several of the hop-growers, however, now send their waggons to meet the pickers at the station. "Hoppers' houses" are also provided for them. These buildings are rough wooden structures—one for the men and another for the women—with usually a grate for cooking and plenty of clean straw for bedding. Other farmers permit them the use of a piece of waste ground or the corner of a field, where they may erect little tents or old hop-sacking to shelter them during their fortnight or three weeks' outing. And in the pleasant lanes and sweet green fields of Kent, and Surrey, and North Hants at this season, many such little encampments may be seen nestling under a tall hedge or on the lee side of some rich copse, with the blue smoke of the wood fire rising slowly up into the clear sky. The East-enders enjoy their picnic quite as much as do their wealthier neighbours.

The "hoppers" rise early in the morning, and while yet the dew is thick on the fast-shining foliage, and the red sun low in the sky, they take their way to the hop garden, the only sound in the still air being the chirp and twitter of the "half-awakened birds." Altogether a happy and a wholesome change from the foul dens and rookeries to which, alas! the hop-pickers will return all too soon! Arrived on the ground they speedily commence work. Usually they are divided into two parties, the people from the neighbourhood being in one, and those from town in the other "set." Each party has an "overseer," who is constantly on the spot, and at noon and [illegible] "measures" the hops that have been picked. There are also a number of "pole-pullers" attached to each "set." The pole-puller's business is to cut the hop-bine about a foot from the ground, so that it does not "bleed" too much, and then to pull up the pole with an iron-toothed "dog," so that it is not injured, for the poles are an expensive part of the hop-grower's stock, and have to last several years. The pole, covered with its leaves and flowers, is then placed across a "bin"—which consists of a large open-mouthed sack stretched round a wooden frame—and the hops picked into it. Leaves have a curious disposition to find their way into the bins also, and the cry of the pole-pullers as they walk about the ground, "Pick out your leaves! pick out your leaves!" is quite one of the characteristics of the hop gardens. As the sun reaches the zenith, and noon draws on, another cry is heard of "No more poles! no more poles! no more poles!" The first "measuring" is to begin. Bushel baskets of wood or wicker are given out, and a long line of empty "bins" is placed along the hop ground. Before each one of these in turn the overseer takes his stand, and to him the pickers bring the contents of their frames in the bushel baskets aforesaid. For each bushel a metal ticket is given, and these precious tickets are hoarded as carefully as money.

A sharp eye has to be kept on the pickers that they fill up their measures. For there is great art displayed in filling up the bushel lightly, so that seven-eighths shall appear like a whole! And if if the "missurin' frame" is a little distance off, the troublesome hops will perversely shake down, and then the ragged child, with long tangled brown hair hanging around her sun-tanned face, will endeavour to surreptitiously empty the hops into the frame before the lynx eye of the overseer can notice the deficiency. "Fill up your bushels, fill up your bushels;" is frequently heard; and as a rule we fear sufficient attention is not paid to it. At last our patient friend loses his temper a little, and the giving of a few three peck tickets instead of full bushel tokens generally reduces the most refractory to reason. Ah! but it is a sight to see how artistically the women round their arms as they bend over into the frame, and gently lift and coax the hops lightly into the baskets. How great are their efforts to make three pecks go to the bushel! It is seldom a man is seen filling the baskets; he is far too heavy-handed, we suppose; he would be more likely to crush in five pecks instead of four! He may carry the basket to the "missurin' frame" if he does not jolt the hops down too much. But we fancy he is shy of this little business, for hops will jolt down if the basket is not well filled, and then sometimes we fear he gets such a "tongue-banging" when he returns. This is sad, in the pleasant warm sunshine—especially so, he thinks, as there is no "public" round the corner as there is at home to which he can retire for shelter! Certainly the student of human nature may find much to observe in the hop-garden.

The amount of money earned by the pickers varies very much. If the weather be dry and the hops large, the number of bushels picked will be larger; if the weather be damp, it causes the hops to lie close in.

In the measuring baskets if the hops be small and poor, a much longer time is necessary to pick a bushel. In such a season the grower often gives a penny or two pence per bushel more; the average price being three or four pence per bushel. Thus, the expenses being light, a small family, if industrious, could easily make £3 or £4 to take back with them to their London home, after enjoying a happy and healthful holiday. Unhappily, drink too often plays havoc with their earnings. And when the last pole has been pulled, and the gardens—recently the scene of so much happy and healthy labour—are deserted, when the last load has rolled home to the kiln, and the joys of pay-day have come, then too often the pickers change their bright gold for treacherous liquor, and the pleasant country byways show disgusting sights of strife and drunkenness.

Of late years much has been done to improve the hop-pickers' lot, and to shield them from temptation. Mission tents dot the hop-picking districts; zealous home missionaries distribute tracts and hold services, and much real and practical good has been accomplished. But the happy, healthy season soon passes, the hop-pickers drift back home, and the hop grounds spoiled of their treasures are left to the autumn wind and rain.—*Pall Mall Budget.*

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Health, Crop and Weather Report.

[FOR THE WEEK ENDING 21ST OCTOBER, 1885.]

Madras.—General prospects fair; continues favourable in Bellary and Anantapore.

Bombay.—Rain in parts of eight districts, more still required in parts of Guzerat and Khandesh. Reaping of *kharif* and sowing of *rabi* crops in progress in several districts. River still falling in Sindh. Standing crops suffering from deficiency of water, and damaged by rats, insects, and storms in parts of Hyderabad. Cholera in parts of thirteen, fever in parts of sixteen, cattle-disease in parts of eight, and small-pox in parts of three districts.

Bengal.—Slight rain has fallen in almost all districts of Bengal proper but none in other parts of the province. Prospects of *aman* rice, except in places visited by inundation, are generally favourable, but some more rain is now much required in many places. *Aus* rice and other *bhadoi* crops, where not injured by floods, have yielded a fair outturn. Price of rice continues high, though in several districts it has fallen slightly. Fever is prevalent in some districts; otherwise the general health is fair.

N.-W. Provinces and Oudh.—Fair weather is reported from all districts, but rain would be beneficial in most. *Kharif* nearly harvested, and *rabi* sowings in progress everywhere. General prospects good, markets well supplied, and prices steady. Cholera and fever continue to be reported from some districts; otherwise public health is good.

Punjab.—No rain. Fever prevalent in the Hissar, Delhi, and Peshawur districts; otherwise the health of the province is good. Rain much wanted in the Jullunder, Ferozepore, and Sealkote districts. *Rabi* operations in progress. Prices falling in the Mooltan district, stationary elsewhere.

Central Provinces.—Prospects everywhere favourable, except in Raipore, where rain is wanted. *Rabi* sowings progressing. Health good. Prices steady.

British Burmah.—Cholera severe in two districts, slight in four districts, elsewhere public health good; cattle disease slight in eight districts, elsewhere health of cattle good. Crop prospects good in all districts, except Thayetmayo, where more rain is wanted, and in Mergui, where the crops have been partially flooded.

Assam.—Weather seasonable. Public health improving; cattle-disease still in some mauzahs. Portion of *sali* crops reported to have been destroyed by insects in some villages. Prospects of crops fair. Tea doing well. Common rice 14 seers per rupee.

Mysore and Coorg.—Tanks in the Bangalore and Tumkur districts are reported to have received good supply of water. Standing crops in good condition; sowing of *ragi* and horse-gram continues throughout the State. Season prospects and public health good. Six deaths from cholera reported in the Sorab taluk of the Shimoga district; cattle in good condition, excepting in parts of the Kadur and Shimoga districts, where murrain still prevails. Prices slightly falling in Bangalore, and risen slightly in Mercara. Picking of coffee crop commenced in South Coorg.

Berar and Hyderabad.—Weather cloudy in Amraoti, where cotton picking commenced; *rabi* sowing progressing. Wheat 22 and *juari* 26 seers per rupee. Crops progressing favorably and *rabi* sowings in hand in Akola. Standing crops good; *rabi* weedings continue. In Hyderabad general health fair except in some places, where fever prevails. Prices in Hyderabad: wheat 13, coarse rice 12½, white *juari* 19½, yellow *juari* 24½, and *tur* 15½ seers per current sicca rupee.

Central India States.—Prices stationary. Health good. Little water in wells and tanks in Indore. Weather seasonable, 29 cases of cholera in Rewah, 14 deaths; cholera generally prevalent throughout the agency. Prices falling in Sehore. Prospects improving in Manpore, where water-supply still scanty.

Rajputana.—Bright warm days with passing clouds. A little fever. Tanks, wells, and health good. *Bajra* and *moong* cut. Health much improved in Marwar, but cholera still hangs about. Crops suffered much from want of rain in Marwar, where prices rising. *Kharif* very poor; prospects for *rabi* not over-promising in Kherwara. Crops withering through want of rain in Meywar, where fever is prevalent and prices rising. Rain urgently wanted in Haraoti. Cholera in Pachpahar district. In Dholepore, tanks drying; wells decreasing. Fever continues.

Nepal.—Prospects good.

Letters to the Editor.

FRUIT FARMING

TO THE EDITOR.

SIR,—Could any of your friends say in a few words—not to trouble them too much—in what part of the world could Fruit-farming be tried with the best prospect of success, and the smallest amount of capital that a start could be made upon—owner being minded to stick closely to the work himself?

SUBSCRIBER.

October 19, 1885.

TESTING SILK.

I.

TO THE EDITOR.

SIR,—Will your able and experienced correspondent, Baboo Hem Chundra Dutta, oblige me by kindly telling me the best method of testing *silk*, and also how to feed the thread from the gum, if the *silk* becomes stiff and harsh.

"SILK."

Dinapore, October 20, 1885.

II.

TO THE EDITOR.

SIR,—In reply to "Silk," I would say that potash and soap are the only ingredients for testing silk. To feed the thread from the gum, if the *silk* becomes stiff and harsh, I would also suggest a trial with potash and soap, which will cause it to feed freely from the gum.

HEM CHUNDRA DUTTA.

October 26, 1885.

MANGO PESTS, &c.

TO THE EDITOR.

SIR,—I beg to thank you and Mr. Hem Chundra Dutta for the valuable replies to my questions on "Mangoe Pests, &c.," and to state at the same time that I shall take the earliest opportunity of trying the suggested methods, and will intimate the result to you in due course.

A. GURUMURTY.

HYBRIDIZATION OF WHEAT.

TO THE EDITOR.

SIR,—I have read some notices in your paper on the subject of hybrid wheat, but cannot remember seeing any account of the manner in which the hybrids are obtained: in your issue of 10th instant, page 503, it is stated that natural crop fertilization is physically impossible, the process being only practicable by the most carefully practised expert.

I should feel obliged by your referring me to any issue of your paper in which the manner of producing the hybrids is detailed; I ask, because I might be able to induce some of the agriculturists in this division to try experiments if the process is not too difficult.

ED. S. OMMANNEY, COLONEL,
Commissioner, Derajat.

October 15, 1885.

NOTE.—We are very glad to receive this letter, and hope to notice this subject at length next week.—ED., *I.A.*

TEA PLANTING.

TO THE EDITOR.

SIR,—In your issue of the 24th instant, "A Would-be Planter" asks me to answer a series of questions regarding Tea-planting.

In reply I would advise him, like you, Sir, not to rush into such a speculation with such entire ignorance of the subject, *except he secures the services of an experienced and honest tea-planter.* However, the following might help him :—First : climate is the most important of all ; and from my own experience I can say that in several districts of Bengal and Behar, tea cultivation may be carried on most successfully, because, the best climate for tea is a hot, moist and steamy one ; and the districts I have named possess such a climate. In a forcing climate the tea plant revels. Secondly : Rotten fish mixed with wood or coal ashes is the best manure, and will in no way affect the flavour of the tea. Thirdly : A really good tea climate is neither safe nor healthy for its owner to live in. Fourthly : Elevation is not necessary for tea cultivation, but only for the benefit of the planters. Three to four thousand feet would be quite enough. Fifthly : If the soil is good and seasonable, and garden coolies competent, then one man per acre, or else, three men to two acres would be sufficient. And lastly, there is scarcely another investment so paying as tea.

HEM CHUNDRA DUTTA.

October 26, 1885.

P.S.—I have not seen the *Vade Mecum* you refer to, but I would suggest to your correspondent to procure also Colonel E. Money's *Essays on Tea.*

MILK AND ENSILAGE.

TO THE EDITOR.

SIR,—Will you pardon a Cirencester graduate for pointing out that the composition of milk in its various stages is not a matter of opinion, but a scientific fact ? The first milk after the calf's birth, which you stigmatize as "*poor*," really contains five times the quantity of albumenoids as is found a week later in the same cow's milk. After this the constitution of milk remains fairly constant for some time, the exact period varying with the breed of the cow, the nature of the food, climate, etc., but after this period, the yield of milk diminishes in quantity, but improves in quality. This is true of all animals, including human beings. If you have found milk becoming thin as it diminished in quantity, the *gwala* must have watered it.—A few words as to ensilage. In my first letter I pointed out that the value of ensilage would be proved by the experiments carried out by Sir John Lawes. I have not seen his report, but from a reference you make to it, I find that ensilage when given with other food, almost if not quite equals mangels when given with the same amount of other food. I saw the silos from which this ensilage was taken being filled. The silos were specially constructed at a cost of £200 to hold 200 tons. The fodder used was the best pasture grass and oats cut green, and it was packed as carefully as possible. In fact, it was the best ensilage that can be made, and yet the result was that as a milk-producer it was inferior (slightly) to mangels, and as a fattening food no better than the same root. Now mangels contain 88 per cent of water, and less than 1½ per cent of albumenoids, even if all the nitrogen they contain is treated in accordance with the old method as albumenoid ; but later investigations have proved that much of the nitrogen is non-albumenoid, and therefore the real feeding value of mangels is nearly, if not quite, as inferior as the worst food ever fed to stock in England. In any case it *is* far inferior in feeding value to the grass and green oats from which this ensilage was made. It may pay a farmer on certain kinds of land, and in certain climates to go in for ensilage instead of roots ; but no one surely will any longer argue that the process of ensilage improves the feeding value of fodder. No farmer in England would attempt to fatten stock on ensilage *alone*, any more than he would try to do so on roots alone ; but stock can be fattened on exceptionally good pasture alone, but even then it is usual to give a little cake or corn. The main value of ensilage in India is that it is a means of storing food when it is plentiful up to the time when all other food is scarce. To ascribe higher qualities to ensilage will, I fear, do more harm than good in the long run to this process of storing fodder, which should prove a great blessing to the Indian cultivator.

D. B. ALLEN.

October 24, 1885.

Editorial Notes.

WE publish this week an interesting extract on the rates and methods of sowing wheat, and the results obtained at the Indiana Agricultural College. An experiment on this method in some of our agricultural farms would prove of interest, we think.

***

WE publish this week two papers on the agriculture of Finistérre, and Irrigation at the Lézardeau School, Finistérre, by B. C. Basu, Bengal Agricultural scholar at the Royal Agricultural College, Cirencester, which will be read with interest. This young genntleman ought to make a good officer under the Agricultural Department.

***

A CORRESPONDENT writes to the *Statesman* as follows :—Notwithstanding the unusual prevalence of floods in several parts of Lower Bengal and Orissa, which have greatly injured both the *aous* and the *amun* crops, especially in the riverian districts, hopes are entertained that there will at least be a twelve-anna outturn ; of the *kalai* (cereal) it is confidently expected that there will be more than a bumper crop, serving in no small degree to recoup the agricultural classes for the very heavy losses sustained by them owing to the recent floods.

***

A VERY curious article appeared in one of the local papers regarding an "electric tree" said to have been discovered in New Guinea by a party of German explorers. The whole reads extremely plausible, but we are somewhat sceptical about the *bonâ fides* of the writer, who may be "trying on" a gigantic fraud to test the 'gullibility' of a too credulous public. But, to quote the immortal William : "There are more things in heaven and earth, Sempronius, than are dreamt of in our philosophy." We leave our readers to judge for themselves, as the article will be found elsewhere.

***

NEWS has been received at Simla of the enforcement of the embargo on the exportation of Arabian horses from Bagdad, the informers receiving half the value of the horses seized. The whole of the batches of horses bound to Bombay were seized between Bagdad and the Persian frontier. Many animals from other less strict willayets reach Bombay, but if present measures are maintained, there will be a sensible diminution in the number of Iraki and Arabian horses reaching the Bombay markets, while there will be a corresponding increase in the number of Persian horses bought in the vicinity of Muhamra, which is a consequence of there being no embargo at the principal port of exportation.

***

WE learn that Dr. Fairbank, of the American Mission, is doing good work at Ahmednugger by inducing and assisting men of the low castes to take to agriculture. He advances them money to take up a little land, purchase implements and cattle, &c., on the understanding that they must pay 6 per cent interest per annum punctually, and also repay 6 per cent of the principal every year. The scheme is said to answer very well, and a number of Mahars have taken up land and are working it successfully. Last year Dr. Fairbank lent money to twenty-five of these petty farmers to buy seed, and "although the *kharif* crops failed and the *rabi* crops were very poor, the money was all paid back to him within the year."

***

A BOMBAY firm is advertising Russian kerosine for sale ; and this is the first time, probably, that the produce of the famous wells at Baku has reached India. Last year, India imported over 26½ million gallons of kerosine ; and nearly all of it came from the United States. Should the Russian oil be able to compete with American kerosine, Russia will rapidly move up in the list of countries trading with India. At present the United States has 3·07 per cent. of the total value of our trade ; and Russia only 0·08 per cent. The importation of kerosine oil into India has increased, of late years, enormously. "Kerosine," says Mr. O'Conor in his trade review, "is now used everywhere, in towns at least, for illuminating purposes, and in the littoral provinces and places convenient to railways, it has extensively displaced the vegetable oils formerly exclusively used by natives for lights."

⁂

The first report on the prospects of the Cotton Crop in the Bombay Presidency is as follows :—

"Cotton forecast—*Gujarat* : figures for Kathiawar and Baroda not received ; area for Broach, Ahmedabad, Surat and Kaira 575,000 acres, as compared with average 550,000 acres. Early rains favourable, but long break caused withering and damage from insects, good rain has now fallen, and prospects good. *The Deccan* : figures for Khandesh not received, but estimate 650,000 acres; crop below average in quality ; rain late ; Poona, Ahmednugger, Sholapore and Nasik area 25,000 acres as against average 125,000 acres, worse even than last year. Satara return not received. *Southern Mahratta Country* : returns not received, season very late and sowings not complete, late rain promises excellent prospects. *Sind :* reurns not received. Incompleteness of returns prevents further remarks."

⁂

The state of the cotton trade at home has assumed a serious aspect. The *Overland Mail* notices the subject as follows :—

Never, perhaps, since the great cotton panic, over twenty years ago, has trade in North-East Lancashire been so depressed as it is at present. In the district between Preston and Colne, and including the great cotton centres of Blackburn, Burnley, Darwen, Accrington, and Rossendale, there are about thirty cotton mills entirely stopped, and at a large number of places the machinery is only partially at work. From returns recently compiled, it is estimated that in North Lancashire, with Rossendale included, there are nearly 1,000,000 spindles and 50,000 looms standing, which if at work would find employment for more than 20,000 people. In Blackburn there are 5,000 cotton operatives out of work, in Preston nearly 4,000, in Burnley 2,000, in Darwen 1,500. Many of the small firms have succumbed to the severe depression, and not a few of the large concerns are losing money. Mill property is depreciating enormously. Unhappily, the outlook is no brighter than has been the immediate past ; indeed, unless there is a wonderful change for the better, the machinery standing idle, already lamentably great, will be considerably increased.

⁂

The Revenue and Agricultural Department of the Government of India have issued the following memorandum on the prospects of the rice crop in British Burmah :—"Up to the end of September the area actually under paddy crop is 168,920 acres above last year's area, giving an increase of 5·5 per cent. The increase is common to all districts, except Bassein, where there is a decrease of 17,859 acres in consequence of cattle disease and floods. The ploughing and transplanting season was about a fortnight later than last year, but the rainfall has been plentiful and seasonable, and crop prospects are reported to be for the time of year good everywhere, except in parts of the Prome district. No estimate can yet be framed of the outturn, as everything depends on the rice-fields getting a moderate but sufficient rainfall throughout October. Up to the 11th October the rainfall of this month in and near Rangoon has been decidedly favourable for the rice crop."

⁂

A contemporary says :—It may interest those concerned in agriculture to know that there is a flourishing town called Kunigal, the head-quarters of a taluk of that name, within about 12 hours' journey from Bangalore, or sooner if rail and dak are used. The climate is good ; there is a small dispensary, and the Mysore Government has its horse-stud establishment located there on account of its many farm advantages. It has a large tank commanding a good supply of water all the year round, and the assessment of lands below it is favourable to the cultivator. There are actually 806 acres of cultivable wet land, assessed at Rs 4,424-8, available at the present moment, and if it is taken up and cultivated, the produce of straw alone would be sufficient to recoup any small outlay ; all the paddy would be clear profit. Here is an excellent chance for enterprising capitalists, who can get the lands for the mere asking. The sluices and irrigation channels are almost all in fair order, and the Government Executives are giving their best attention to remove hindrances, &c., in them wherever found.

We learn that Dr. Trimen has had a very interesting botanical trip through portions of the North Central, Eastern and Central provinces of Ceylon, working more especially along the sides and within the triangle formed by the roads from Dambulla to Anuradhapura, thence to Trincomalee, and from Trincomalee back to Dambulla. Dr. Trimen visited Pollonaruwa and Mineriya lake, which he thought most interesting ; and altogether this trip has more than ever impressed him with the great variety of country, scenery and resources possessed by the island. Scarcity of water at some of the stopping-places was the chief drawback to comfort encountered, and no one can form a true idea of the many ways in which water is indispensable to the convenience as well as comfort of living, until they find absolutely none to be got for miles around their habitation ! What struck the travellers was the absence of "wells": where such existed the villages are comparatively independent ; and as wells are much easier made than tanks, we may ask why are wells not found at *every* village, and indeed every possible stopping-place on the routes referred to ? In India the authorities apparently pay a good deal more attention to well-digging than is the case in Ceylon so far as we can judge.

⁂

A contemporary says :—

The Americans have "discovered a plant" which, if properly used, may prove to be one of the most important additions to human life that the world has ever seen. It is called "the laughing plant." Not that the vegetable itself laughs. It does not even smile ; but its seeds, if eaten, incite to immoderate mirthfulness. It is described as bearing flowers of bright yellow, and soft and woolly seed pods, in which are inclosed small black beans. The natives of "that part of Arabia in which the plant grows" dry and pulverise these beans, and if this powder is administered "it makes the soberest person behave like a circus clown, for he will laugh, dance, sing, and cut the most fantastic capers. The effect lasts about an hour, at the end of which the 'patient' recovers his normal gravity, and is altogether oblivious of his extraordinary conduct when under the influence of the powder."

The plant would appear to belong to the leguminous order ; but being a recent discovery, we suppose it has not as yet received its botanical name.

⁂

A French correspondent sends the following on the subject of open-air silos to one of the American papers :—

"M. Houlez, the discoverer of the plan of preserving green forage in the open air, continues to record his uniform success. The whole secret of his open-air silo consists in uniform and uninterrupted pressure, so as to secure the expulsion of the air, and thus prevent the decomposition of the mass. The silage should be carted to the place for stacking, as soon after being cut as possible. There is no necessity to wait for its being dried ; humidity is not at all an obstacle ; nor is rain, save when it interferes seriously with work. Spread the forage uniformly, keep the stack from leaning, pile up slowly, so as to allow the mass to settle down little by little, and the fermentation to commence, thus securing tenderness in the forage. Select planks sixteen inches wide and one inch thick ; allow them to project a few inches over the side of the stack. Cover the planks with earth, firewood, stones, &c., at the rate of 23 cwts. per square yard. To open the stack for use, it could be constructed on the principle of a series of parallel walls, and so obviate all difficulty. The drawback of the open-air silo lies in not being able to count upon keeping the erection of the stack perpendicular."

⁂

A correspondent sends to a *Bombay* paper an account of a most interesting experiment carried out by *Dr. S. Cooke, of* the Poona College *of* Science, which promises to solve the problem that has so long baffled municipal bodies, town corporations and even scientists. If Dr. Cooke's discovery, for which, it is stated, he has secured a patent, is really what the correspondent represents it to be, the Doctor must be regarded in the light of one of the greatest benefactors of the age ; for not only does his discovery dispose of a most vexed question that has long formed the subject of much discussion and speculation in this country, but it adds a most important item to agricultural fertilizers. The subject of converting the refuse of towns into poudrette has been discussed in these columns from time to time, and Dr. Cooke's discovery would appear to be an improved form of manufacturing this substance. The result obtained by him in the experiment of applying his fertilizer to a plot of ground at the same time with other ordinary manures, speaks volumes in favour of his discovery. The letter itself on this subject will be found elsewhere. We should, however, like to hear more about Dr. Cooke's discovery.

⁂

WRITING on the subject of ensilage for milch cows, an American contemporary states that the experiments and experiences of the past two years are thoroughly confirmatory to the idea, that if in the filling, or immediately thereafter, a high heat can be induced which shall pervade the mass in the silo, and then, all tightly closed, the ensilage will remain sweet until it is re-opened, and an opportunity to ferment is offered by exposure to the air. These results are attained by not too rapid filling, nor too much tramping, the temperature being watched, and as soon as that of one layer or portion reaches, say 130 degrees Fahr., another layer of three or four feet in thickness may be added, levelled off, packed a little around the sides and left for a day or two to heat in turn. Pits filled in this way last year turned out beautifully, and the cattle, especially milch cows, have had healthful, excellent feed, fragrant and sweet, and, of course, highly relished. When such can become the general or universal condition of ensilage on good farms, the objections to its use will disappear. Heating of ensilage is promoted by cutting, by which the juices are exposed to the action of ferments, the germs of which are almost universally distributed in the atmosphere near dwellings and farm yards. The very fine cutting which used to be recommended, is probably unnecessary, but neither corn nor clover, when packed whole, come into a uniform heat. and we presume the same would be true of other ensiled plants.

⁂

THE Americans have been experimenting with ensilage in every form. In contrast to the foregoing, Mr. Monroe Morse, president of the Franklin (Mass.) farmers' club, says that he filled his silo last season with green sweet corn fodder put in *whole*, and carefully packed and trodden. The expense of filling was much less than if the corn had been chopped, but at the sides of the silo there is more corn injured by loose packing, than if it had been cut fine. It is less work to feed it out, as it can be taken up by the forkful without the use of baskets. About three weeks were occupied in the filling, and a high degree of heat was generated, though the temperature was not tested by a thermometer. The silo held more ensilage than if the corn had been cut with a machine, as it settled more and became very solid. The silo was filled completely full two or more times, settling enough each time to take in several large loads of fresh corn at a time. The ensilage comes out sweet, and is eaten with great avidity by the cattle. Many of the stalks had small ears of corn attached, and these also came out sweet and sound, better than last year when chopped. Mr. Morse is satisfied that it is better to be three or four weeks filling a silo so that the contents will be heated to a high degree of temperature.

⁂

WITH reference to the representation of Ceylon at the Indian and Colonial Exhibition, it is stated that the suggestion made by the Secretary of the Royal Horticultural Society, that a selection of suitable plants should be sent from Ceylon to be placed in the Ceylon Court of the forthcoming Indian and Colonial Exhibition in London, is being acted upon, though it is to be feared the arrangements are rather late, the cold, on the arrival in England of any plants now being shipped, being likely to try them very severely. There are but few Ceylon plants which are likely to resist the drought and cold of the Exhibition building. Such as are thick-skinned and hard-leaved may prove a success, and, accordingly, about a dozen fine specimens of the madu, or sago palm, and the indi, or date palm, have been selected for shipment, with stems nine or ten feet high. A similar number of the beautiful tree fern will also be sent from Ceylon in a few days, in the hope that they too may survive the cold of the latter portion of the voyage home. On their arrival they will be handed over to the officials of the Royal Horticultural Society, who will winter them in their hot-houses on the ground at South Kensington adjoining the Exhibition buildings, whence in May next they can readily be transferred to the Ceylon Court. The trophies of sport, if successfully treated, should form very attractive objects, and by careful daily attention they may be carried through all the ordeals to which they will be subjected. The tree ferns, even though their vitality suffer, would still present very attractive features; if we are not mistaken, these plants are not to be found in any hot-house in England, and they will therefore prove a great novelty.

⁂

THE Ceylon Chamber of Commerce have published their returns of the export season just closed made up to the end of the fiscal year, 30th September, from which it appears that there was less coffee shipped than last year, *viz.*, 314, 811 cwts. against 323, 941 cwts. last year. Cinchona shows an increase from 11,492,947 to 12,697,830 lbs. The exports of Tea have exceeded the estimate of 3,500,000 lbs. by 269,684 lbs. The following is the table of distribution of Ceylon exports from 1st October 1884 to 30th September 1885 :—

COUNTRIES.	Coffee.	Cinchona.		Tea.	Cocoa.	Cardamoms.
	cwts.	Brch. lbs.	Trunk. lbs.	lbs.	cwts.	lbs.
To United Kingdom	2,30,084	10,88,575	90,57,992	37,35,609	6,011	1,37,672
,, Marseilles ..	5,285	18,025	53,467	6,826	273	430
,, Genoa ..	381	..	61,775	..	..	..
,, Venice ..	3,709	..	1,14,274	346	..	..
,, Trieste ..	31,846	11,511	..	158	..	600
,, Havre ..	7,538	..	..	..	..	..
,, Rotterdam ..	553	25,029	5,27,059	190	16	696
,, Amsterdam ..	..	..	10,097	..	80	..
,, Other Continental Ports ..	3,759	..	7,790	976	121	791
,, Africa ..	..	..	..	..	..	..
,, Mauritius ..	557	..	..	3,080	..	..
,, India and Eastward ..	7,726	..	..	8,019	72	9,893
,, Australia ..	21,946	..	..	41,124	28	1,650
,, America ..	943	..	1,02,769	367	2	689
Sundry Ports ..	94	..	..	..	..	..
Total Exports from 1st Oct. 1884, to 30th Sept. 1885.	3,14,811	11,43,140	1,03,35,320	37,96,681	6,758	1,52,405
Do. 1883 do. 1884	3,23,941	16,53,904	1,01,39,053	22,62,539	9,868	66,819
Do. 1882 do. 1883	2,60,058	69,25,595		15,22,862	3,588	21,655
Do. 1881 do. 1882	5,64,546	30,09,895		6,28,292	1,018	28,197

⁂

THE *Ceylon Times*, writing on the future of the Cinchona trade and cultivation in Ceylon, says that the satisfactory prices realised at a Cinchona bark sale reached as much as 30 cts. for 1 per cent bark per unit. "The rise was no doubt due to the receipt of intelligence from London quoting the unit firm at 6½*d*. As times go, this cannot but be regarded as a fair price, 3 per cent bark being worth very nearly a rupee a lb. Should prices continue at all as at present, we do not believe that the falling-off in the years's exports will be so very great after all. There is, as we have all along maintained, a great deal more cinchona in the island than is generally believed, and good prices cannot fail to bring a large quantity to market. The ups and downs which the cinchona bark trade and the cultivation also have undergone of late years, seem now about to settle down into what we trust may be a fairly prosperous state of affairs. The enormous over-production which would have occurred in Ceylon but for the correction of canker has brought prices down to a point beyond which there is no prospect of their receding, whilst the almost complete cessation of planting has brought about a much more healthy state of affairs. With the unit of quinine above 6*d*. in London it will pay to grow cinchona, and as we have been taught by rude experience that the delicate tree will not thrive in every locality, there is little probability of its being planted where there is not every prospect of its being a success. Those who have a fine cover of cinchona of any age are likely before long to reap very substantial returns therefrom, for the stock of bark in the various trade centres is not large, and manufacturers are by no means well supplied with the article. The first upward tendency is, therefore, likely to set buyers purchasing with a still further stiffening impetus to prices."

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THE following is a summary of the health, crop, and weather reports for the week ending 21st October, 1885 :—

Rain has again fallen throughout the Madras Presidency, and prospects are improving in all districts. In [illegible] still urgently wanted. In Bellary and Anantapore prospects are now favourable. From Mysore the report is also favourable; the standing crops are in good condition, and sowing of *ragi* and horse-gram is general. Except in parts of Kadur and Shimoga, where murrain prevails, the cattle are in a good condition. In Coorg coffee-picking has commenced, and the prospects of the season are good. In Bombay rain is reported from parts of eight districts, but rain is still required in places in Guzerat and Khandesh. Reaping of *kharif* and sowing of *rabi* are in progress in several districts. In parts of Sind the crops are suffering from want of water and from damage by rats, insects, and storms. In the Berars and Hyderabad the *rabi* sowings have commenced; the crops promise well. Very little rain is reported from the Central India and Rajpootana States. In the former prospects are good on the whole; but in Rajpootana rain is needed for the *rabi* sowings in several places. No rain has fallen in the Central Provinces during the week; but prospects are favourable everywhere, except in Raipore, where rain is wanted. *Rabi* sowings are in general progress. In the Punjab rain is much wanted in the Jullunder, Ferozepore, and Sialkot districts for the *kharif* crops. *Rabi* operations have commenced in some districts. From the North Western Provinces and Oudh fair weather is reported, but more rain is wanted in most districts. The *kharif* harvest is approaching completion, and *rabi* sowings are in progress everywhere. General prospects continue good. In the Lower Provinces slight rain has fallen in almost all districts of Bengal, but little or none in Behar and Orissa. In Bhagulpore, Durbhunga, Hazaribagh, and Gya more rain is wanted for the crops. Agricultural prospects are on the whole favourable, except in flooded tracts. In Assam the weather is seasonable and crop prospects good. In British Burmah the crops promise well. Fever is more or less prevalent in all provinces; otherwise the public health is fair. Prices are generally stationary, except in Mysore, where they are falling.

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A CONTEMPORARY furnishes the following statistics of the Malt liquor trade of different countries:—

The rapid growth of the brewing industry in the United States is something wonderful. The value of the output has advanced from eighteen million dollars in 1860 to upwards of a hundred millions in 1880. It is estimated that over 3,000,000,000 gallons of malt liquors are annually brewed in the United States and in Europe, of which Great Britain produces nearly 1,000,000,000, Germany 900,000,000, Austria-Hungary 280,000,000 more, and the United States 600,000 000 gallons. Mr. G. P. Keese, in an article in *Harper's Monthly*, says:—"English brewers are, as a class, the most wealthy of her manufacturers, and much land is passing from its old time owners into their hands. 'That is beer! that is beer! that is beer! and *that* is beer!' said a Scotchman recently to an American fellow traveller on one of the Scotch lakes, as he pointed east, west, north, and south to fine estates formerly belonging to old Scotch families. The present Parliament includes fourteen brewers and one maltster. The town of Burton on Trent, the centre of the trade, is one enormous brewery. It includes over thirty great brewing firms, among them those of Bass and of Allsopp, which, with the great Guinness brewery of Dublin, lead the trade." The firm of Bass alone covers 150 acres with its works, has several miles of private railway connecting them, employs two thousand persons, and produces above 750,000 barrels of beer a year. Nearly a third of the British revenue comes from the excise tax on beer and spirits, the total yield in 1883-84 being upwards of 87 millions sterling. It is hardly to be wondered at that such a fertile source of revenue should have provoked conflicting theories of taxation. M. Leon Say, the French Minister, holds that in taxing ardent spirits legislation should be guided exclusively by fiscal considerations, while Mr. Gladstone is of opinion that "fiscal grounds must necessarily be secondary, and that the question ought to be decided on social and moral grounds." The question is whether taxation should not be framed so as to discourage the drinking of the less wholesome beverages, and the Swiss Statistical Bureau, which is an authority on the subject, replies in the affirmative. Taxation is perhaps the most effectual of all checks on intemperance, and it is curious that the fact has not been more fully recognised in legislation in India. Now that the sources of revenue are being looked to more closely, we may expect to see taxation fall more heavily upon some of those native indulgences which have hitherto been granted a dangerous immunity.

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THERE has been some controversy respecting the true origin of the Ceylon Tea enterprise, and Mr. P. D. Millie, writing from Edinburgh to the *Ceylon Times*, claims to set the matter at rest. He says:—

In your overland issue of the 7th August under the head of "Planting Notes, Rambodde, August 3," is the following statement:—"Shortly after the North Pundaloya estate was opened, a steep face of the new lands, estimated, I think, at 10 acres, was put into tea, and, in due time, a man from the Sunderbunds, a Chinese if my memory serves me, was imported to superintend the making, sent over by a nephew or cousin of one of the proprietors," &c.

This is an error. No one was ever imported to superintend the making of tea. I frequently attempted to make it myself, but failed. The tea *to look at* was good, but it was nauseous and bitter to the taste, and I gave up the attempt, having nothing to fire it in but an earthen chatty.

On my leaving for England, Mr. Lyford, who was left in charge, was more successful in his attempts to prepare the tea and told me he used it for himself. A small packet of this tea was sent me by him, and on my submitting it to a London broker for his opinion, it was "excellent tea, but badly prepared—spoiled in the preparation."

We were under the impression in those times that the preparation of tea was a subject most difficult to obtain any practical information about, and although we were well aware that it would grow well, yet, what was the use when we could not prepare it? And for any small acreage it was not worth while to import a man on purpose.

It was then even said and believed, that the Chinese kept the mode of preparing tea secret, which they would not make known.

So convinced was I then that tea would grow well in Ceylon, and that the country would eventually grow it very extensively, that I had serious intentions of opening a large tea clearing; but at that time having so much coffee land in course of planting, I had neither time nor labour to spare for tea, which was the reason I was deterred from the further extension of tea, and not as your correspondent states that it was "*badly bugged*" as I do not remember the tea on North Pundoloya having ever suffered from bug.

I may state that the original planting of tea referred to was from seeds of the Chinese species obtained from the Peradeniya Gardens, and the Assam species from seeds forwarded from Calcutta by Capt. Reddie. The former made a poor appearance in growth as compared with the latter, which flourished luxuriantly, as if it were in its natural soil and climate, from which I then inferred that the Indian teas would be the proper sorts to cultivate, not the China tea.

More than twenty years ago I knew that Ceylon would at some time be a great tea producing country, but then nobody would give attention to anything but coffee.

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WE have received a copy of the report on the Cattle and Horse Fair, held at Umritsur in April last. This is one of the largest and most important horse and cattle fairs held in India. The report comes six months after the event; but we are told that the delay in its compilation was unavoidable. The attendance of animals was the largest on record, the total being 92,961 head of cattle, and 5,569 horses, the increase over the total of the previous year being 13,450 head of cattle and 1,500 horses. The attendance, too, at the fair exceeded previous experience, the chief cause of this probably being the brisk demand from the frontier, the Commissariat contractors doing a large business, chiefly in the expectation of the movement of troops in the direction of Afghanistan. Of the total number of animals exhibited for sale, 74,720, or about 80°/o, found purchasers. The average price per head fell from Rs 14-0-5 to Rs. 13-11-9, but the total proceeds rose from Rs. 8,15,304 to Rs. 10,26,127. Considering the increased magnitude of the operations of the fair, the Deputy Commissioner does not consider that the falling off in the average is so great as to create surprise. Prizes to the amount of Rs 2,010 were awarded to 140 animals specified as cattle. Awards to the amount of Rs. 220 were also specially set apart for draught oxen. The income from all sources, for both the cattle and horse fairs, was Rs. 10,460-2-3, against Rs. 8,037-2-3 in the previous year. The expenditure was Rs. 4,944-12-0 against Rs. 4,356-15-[illegible]. This increase is, however, only nominal, and is due to an expenditure of Rs 600 on prizes granted by Government to horses. The amount expended in awards to horses was in addition to that awarded to cattle, and Rs. 1,000 were given for this purpose, 77 animals receiving prizes. These cattle-shows are still in their infancy in India, but the movement is showing great signs of development, and only requires we suspect the impetus that would be given by a more liberal offer of awards, to render it very popular. It should certainly be encouraged all over the country.

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We regret we cannot agree with the line of argument taken by Mr. Allen in his letter, which we publish to-day, on the composition of milk, and the relative value of ensilage as a milk-producer. As a distinguished graduate of the Cirencester Agricultural College, his views on agricultural matters are entitled to much weight, and we need hardly say that it gives us much pleasure to hear from him. But in regard to ensilage, we hold entirely different views. As to milk, we may remark that the first milk (colostrum) after calving is not, as a rule, considered fit for human consumption in this country, so far as we are aware. To explain this, it may be stated that ordinary milk is composed of—

Water	87·25
Butter	3·50
Caseine	3·50
Albumen	0·40
Milk—sugar	4·60
Mineral substances	0·75
	100·00

This, of course, varies very considerably—the variations being due to the breed of the cow, the nature of the food, climate, &c. As an instance of this variation, we quote the following table furnished by Professor Sheldon :—

Water	83·65 to 90 00
Butter	1·80 to 5 20
Caseine	3·00 to 5·00
Albumen	0·30 to 0 55
Milk—sugar	3·00 to 5 50
Minerals	0·70 to 0 80

The first milk from the cow contains a superabundance of caseine or curd, and this substance, as is well known, is rather hard of digestion. Irrespective of this, the first milk is not in a state of perfect solution and proportion. Professor McConnell says :—

> To understand how milk was produced, it is necessary to have a clear knowledge of the structure of the cow's udder. The mammary gland consists of two halves of highly developed tissue; each half has two teats (the third is abortive), and each teat is literally a hollow bag fastened on to the bottom of the udder. At the top of each there is a cavity, known as the "milk cistern," and from this there ramify tubes in all directions through the substance of the vessels. These tubes grow smaller and finer away from the teats, until at last they end in microscopically small sacks, which are lined with epithelial cells. These sacks are grouped into globules of three to five, and have a common outlet. It is the function of this cell structure to manufacture the milk, or at least the corpuscular part of it. Part of the milk must, of necessity, be simply transuded from the blood through those cells—the water, for instance—as the outside of the globules is thickly lined with blood vessels; but other parts (and especially the butter globules) are manufactured by the living action of the lining cells. New cells are formed behind the old. These are pushed off, and fall into the cavity of the tubes; but before doing so they had the interior metamorphosed into butter particles, the walls disappear, and normal milk is the result. *Colostrum, or the first milk after calving, contains a large amount of these cells in an unchanged condition.* The activity of these cell structures can be stimulated greatly by proper feeding and general treatment, and the proportion of solids to water increased by rich food, though at the same time the breed and general characteristics of cows have much to do with it.

The words we have italicised will explain our meaning. For the rest, we stated before what our own experience has been.

In respect to ensilage, we have said sufficient to prove its superiority over ordinary fodder in its green state. We do not, however, remember to have said that stock fed on ensilage *alone* would produce the best results. It is to be understood that corn and other solid food, such as oil-cake, roots, &c., forms part of the diet of stock in addition to silage. We have consistently maintained that as a means of storing fodder when plentiful against a time of scarcity, the system of ensilage cannot be surpassed; and we have strongly advocated the encouragement and introduction of the system in certain localities in particular, and throughout the country in general. But we are unable to see how "by ascribing higher qualities to ensilage," it will "do more harm than good in the long run."

AGRICULTURE OF FINISTERRE.

[*By* B. C Basu, *Bengal Agricultural Scholar, at the Royal Agricultural College, Cirencester.*]

The agriculture of Finisterre, in common with that of many other parts of Brittany, has been largely influenced by various circumstances, social and physical, of which it is necessary to recount a few important ones. Originally descended from the Teuton race, the Bretons have so long kept the purity of their blood, and the language and manners of their ancestors. Their physiognomy is at once distinguished from that of the Latin race to which the rest of the French belong. An entirely distinct language, and an almost perfect seclusion in the highlands of Brittany have kept them more or less away from the general current of progress in France; even at this day, in spite of the equalizing tendencies of the age, they are regarded by competent observers as at least a century behind in the march of modern civilization. The true Breton house with its curved roof heavily thatched with straw is still pretty common; in the interior, heavy cubical bedsteads with folding doors present a singular relic of olden times. The people are conservatives of the most orthodox type; alike in religion and politics as in agriculture, they are very slow to change. The clergy wield an enormous power in Brittany; the revolution of '93 scarcely affected its pious children. The recent annulment of the Senatorial election of Finisterre has been a violent rebuff to the Breton clergy who had been hitherto manipulating all the political powers of their faithful flock. So long secluded from the general current, the country is at the present time undergoing a series of far-reaching revolutions. It is hardly sixteen years that railways have been extended into the extreme west of France, and already remarkable changes have taken place in the habits of life of the people. Side by side, compulsory service in the army, and compulsory education—a measure of only recent years, will influence in the same direction. Before railways were introduced, the peasants lived an almost totally vegetarian life, tasting meat perhaps once or twice a year on days of high festivity. Their sole ration consisted of, and to a large extent even now consists of, black bread, and a peculiar *crêpe* or pancake made of buck-wheat flour. Many peasants do not know how to read or write, not to say that they neither speak nor understand the French language. In a few years, however, a new generation will rise, who shall have no such difficulties; all the evils of circumscription and seclusion will thus steadily disappear. The price of labor has risen a good deal in these latter days; with all that, however, it is 15*d.* for man, 10*d.* for women per day—scarcely half of what a laborer earns in other parts of France.

I have already sketched the leading physical features of Finisterre. It remains for me now to say a few words on the way in which some of them bear on the agricultural enterprise of small peasants. In walking through any part of Finisterre, one meets with cultivated fields as often as with broad expanses of heath. All high altitudes along the eastern border of the department, the tops and sides of hills are alike but vast sheets of heather, broom and fern. These are occasionally relieved by small patches of meadow, or fields where buckwheat or rye may be struggling with ferns which are the natural heirs of the soil of the district. A totally different order of things is visible along the sea coast. There a very superior nature of cultivation prevails; along the sea coast I have seen some of the most splendid crops of wheat and oats that I recollect to have seen in France or elsewhere. The peasants seem to be in much easier circumstances; they have no longer to contend for the mastery of their fields with ferns—so insuperable in other parts. They use large quantities of sea-weeds to manure the fields; these decompose rapidly, and when duly mixed with home made manure, do not fail to yield abundant harvests.

Between the sea coast and the eastern border of Finistérre, is the region of middle altitudes from 300 to 400 feet above the sea. This includes Lézerdeau. The order of things here is midway between what it is in the districts described above. While extensive fields and meadows are quite common, there remains a good deal of waste yet to be reclaimed from the wild state.

It may be now asked what prevents the reclamation of such lands? To this it may be simply replied that the difficulties are so immense that a good deal even of such as have been already reclaimed is far from being so in the real sense of the term. I have previously stated that according to chemical analyses some soils in the neighbourhood of Lézerdeau show an amount of acidity which is stupifying. Acidity of soil is always fatal to the growth of crops; it must be neutralized in any case before successful cultivation may be at all possible. To destroy the acidity of the soil, we have two means. The first consists in employing and incorporating with the soil such a quantity of lime—either as carbonate or phosphate—as corresponds to the degree of acidity. On the soils abovementioned, fully 50 tons of carbonate of lime would be required to attain this end—which means a prodigious expense of no less than £20 per acre. Such a measure is clearly outside the dream of even the richest proprietor. The second means consists in helping the oxidizing action of the air by frequent deep stirrings of the soil—as well as such means—as weeding, draining, etc. In either way capital lies at the root of the question: the problem of reclaiming or amelioration of poisoned soils resolves itself into one of capital. The question of capital presents two important aspects in relation to the *petite culture* of France. In the first place it passes for an axiom that the amount of relative capital—*i.e.* capital sunk per acre of soil cultivated—is much more considerable in the case of small properties than in that of larger ones to be equally effective in either case. Thus, while a farm of 100 acres can be well cultivated (say) with a capital of £10 per acre, it is next to impossible to cultivate in the same way one of 20 acres, even with a capital of £20 per acre. Capital is much less effective in small properties, simply because it does not find its full sphere of action.

In the second place, the French peasant, even supposing him to have sufficient capital at hand, instinctively prefers to sink it in the purchase of land, rather than to employ it in ameliorating what he already has. This great evil—the "demon of property" of French economists—undermines the very foundation of all agricultural improvements. While capital is minimized for the cultivation of the soil, it is pushed to its maximum in its purchase: land not worth 25s. an acre elsewhere, often sells for 5,000 francs a hectare, *i.e.*, at a fully 60 years' purchase! Such sales are only possible in small parcels, in order to be within the reach of the largest number of competitors for the purchase; large properties are thus disposed of in this way with great benefit to their owners; a practice which still further aggravates the evils of land "dissection," as it has been termed. This intense thirst of the French peasant for increasing and "rounding the corners" of his little property results from the social constitution which has risen out of the French law of heritage. All property being equally divided among the children, it is quite natural that the peasant, whose occupation is at any time too small, should be anxious to augment it, so that he may leave enough to every child on his death.

To return to Brittany. Although extensive culture is all but unknown among the small proprietors, yet here and there, cases are found in which the cultivators have made some attempts towards it, and obtained good results too to boot. An instance of this kind is found in the person of a very enthusiastic peasant named Pilorger, in the vicinity of Quineperte. I went to see his property one day in company of Monsieur Viaud, Professor of Agriculture at Lézerdeau. It consists of about 20 acres—a great portion of which the owner has reclaimed for himself, from ferns and heather at considerable expense. Monsieur Pilorger enjoys a well-merited reputation in his district for his potatoes. After having experimented with 30 different varieties of potatoes, he has arrived now to choose three or four which give him the best results. One of these, it may be mentioned, is the *magnum bonum*, so favourably known in England. His pastures and fields are heavily manured every second year with farmyard manure which he enriches with nightsoil obtained at Quineperte; their produce is far superior to the average of the country. It may be stated by the way that night soil is pretty frequently used in Finisterre, as well as in many other parts of France, but its use is by no means general. Apart from the prejudice against it, it requires a good deal of special tools and carriages, &c, for its utilization. Monsieur Pilorger is also a good breeder of the native Breton cattle; recently a herd book has been established of the breed; several of his cows have been entered into the book, and a bull and a cow of his obtained the first prizes in the last Regional show at Brest. Though a peasant, he is well-instructed, reads the important *Agricultural Journal*, and thus closely follows the precepts of modern agriculture, and no doubt to these he owes his success.

The condition of the smaller class of peasants is anything but enviable. The average size of occupations is barely 3 hectares (7 acres). These, with soil so handicapped by nature as described before, offer at best a very meagre subsistence. All the evils of land division have been exaggerated in Finisterre. Elsewhere industry and emigration carry away the surplus of the peasant population, and thus prevent to some extent excessive pulverization of land. That land has been more minutely divided in Finisterre than in many other parts of France is at once evident in the relative sizes of fields. These are often ridiculously small in Finisterre; on one field hardly ½ an acre in extent, I counted four distinct crops growing side by side, *viz.*, buckwheat, oats, potatoes, and clover. The size of the entire property of the owner may be easily imagined. The ignorance of the Breton peasant prevents him from going far in quest of more remunerative employments; when he has not sufficient land to occupy all his time, he has to rest content with the 12d. or 15d. of wages, which he can earn by day work. Rather cleanly in appearance, his dwelling, however, often presents the most filthy appearance. Pigs and poultry may be seen grazing alike in the yard as inside the house; all the filth and muck of the manure heap outside being *drawn, so to speak, to the very foot* of the bedstead. His destitution is often painful to behold. From what I have seen since then in the south of France, my ideas as to the relative easiness of peasant-life have almost entirely changed. In the south, as I shall have occasion to speak of in later reports, the dwellings of the peasants, and the amount of comforts inside them leave nothing to be desired. In Brittany, the state of the peasants is often very disappointing. Beggars abound everywhere. From the railway station to the town of Quineperte, within a distance of a mile, one can certainly count upon meeting at least half-a-dozen of half-starved creatures. In fact the prophecy of MacCulloch has been so far verified in the case of Brittany, when in the year 1823 he wrote: "In half-a-century France will have become the great pauper-warren of Europe." Happily, we have reason to believe quite otherwise in regard to the other parts of France. Begging, however justifiable it may be in particular cases, is always liable to carry in its train results of a demoralizing nature; it has not failed to do so in Finisterre. Very often boys and girls are made to beg, though apparently in easy circumstances, and often stout robust fellows would not hesitate to step beside on the road to beg for a penny. I was deeply affected with the extraordinary amount of beggary I saw in Finistérre, but have been since greatly relieved to see a happier order of things in the south.

The peasants of Finisterre have profited very little by modern inventions and the teachings of scientific agriculturists. In rare cases the old heavy wooden-beamed plough has been abandoned for modern ploughs; the primitive butter-churn, which consists of a wooden or earthen-ware jug fitted with a vertical piston and a horizontal disc, is still pretty common in these extreme western parts of France. With few variations, the husbandry is still the same as it long has been. In the conservation of manure, the peasants show singular ignorance of details. They have long learnt the use of lime by experience; happily for them, vast accumulations of calcareous sand occur along the coast of Finisterre; it is composed of the comminuted debris of marine shells, &c., and contains generally from 45 to

60 per cent, and often as high as 80 per cent, of carbonate of lime. The expenses of carriage are heavy when it has to be carted long distances. At Quineperte, which is about 7 miles from the sea, it sells for about 4d. a cwt. The use of phosphatic manures is one of the lessons the peasants of Finisterre have learnt from the teachings of agriculturists. The soil being usually acid, the neutral tricalcic phosphate is invariably preferred to the acid super-phosphate of lime.

A few words should be said on the live stock of the district. Brittany enjoys a very wide reputation for its cattle and horses. The Breton cow is indeed remarkable in many points. A veritable lilliputian, she thrives on very small quantities of food, often of a very inferior quality; with this she yields milk which is alike extraordinary in quantity and quality. On an average, she gives 260 gallons *per annum*—[illegible]—half of the yield of average shorthorn cows, though she is hardly a quarter the size of the latter. While on the other hand, her milk yields 25 per cent of cream, which is astonishing when we consider that the richest milk of the Jersey scarcely gives 20 per cent. She is very sure of foot, and thus well adapted to grazing on steep hill sides. Her condition in Finisterre can, however, be hardly envied. She suffers in common with the general agriculture of the district. The poorer peasants have not food enough to maintain their beasts. They are very often tethered on road-sides, or on margins of corn fields, where they pick up, as best they can, any grass that may straggle among the ferns. It is marvellous how they live on such scanty fare; but it is not the less certain that their stunted form is only the result of insufficient nourishment. With better nourishment, they do not fail to increase in size, as is very evident in the little herd of Monsieur Pilorger, whom I have named before. At Quinperte, there is a very large market of cattle which meets every Friday; an enormous number of cows is here sold off for exportation to different parts of France. A good deal of shorthorn blood has been lately imported into the breed; with shorthorn cross, the cows attain much larger size and yield more milk, though the latter deteriorates a little in quality. *A few years ago, Ayrshire bulls were in great demand* for crossing, but the results having been very disappointing, and the practice has been entirely abandoned.

The Breton horse enjoys perhaps a wider reputation than the cow. It is largely sought for from all parts of the country. Rather light in form, it is admirably adapted for all farm work, while often it trots well at the cart.

Brittany has a peculiar breed of white pigs of about the size of middle Yorkshires. It has never been improved; the enormously long heavy head, high legs, and large flapping ears of the Breton pig show it to be rather akin to the wild pigs which graze on the shores of the Highlands of Scotland. Brittany has very fine sheep, a black breed is sometimes met with; these live by browsing among heather at high altitudes.

IRRIGATION ON THE SCHOOL FARM AT LEZERDEAU, FINISTERRE.

[*By* B. C. Basu, *Bengal Agricultural Scholar at the Royal Agricultural College, Cirencester.*]

The school of irrigation and drainage at Lézerdeau is an intermediate agricultural school, and belongs to the category of *Ecoles pratiques*, of which there are several in France. It is, however, much superior to its fellows on account of its speciality in irrigation and drainage, as its name implies. Of the school itself, I have very little to say; the system of education is almost the same as at Grignon; theoretical studies may not be so deep, but practice in everything is rigorously insisted on. As regards irrigation and drainage, the teaching is here more complete than elsewhere.

Monsieur Baron, the Director of the School, is at the same time the tenant of the farm itself; he has also rented two adjoining farms, and the three together form a compact occupation of about 250 acres. It is, however, on the school farm that meadows have been laid down to irrigation. Before describing its practice in detail, it will be better to glance at the aspects of the country, its soil and climate, as these bear very largely on irrigation.

The country about Lézerdeau partakes of the characteristic mountainous nature of Finisterre. Flat table-lands more or less extensive, are split through by deep gorges often with almost perpendicular sides; the excess of rains which have fallen on the uplands collects into narrow brooks which rush impetuously along the bottom of the valleys. The whole landscape is, indeed, that peculiar to primary formations. The basis of the soil is granite, intercalated with very extensive veins of quartz and amphibole. It is sandy or clayey according as quartz or felspar was the predominating factor of the granite from which it has been formed. On the school farm, the soil is almost of a very light sandy nature, and rests on a bed of impervious clay. The soil of the locality is usually very deep, unless on the steep flanks of valleys, or where otherwise exposed to considerable washings. Chemically, the soil is unusually rich in potash, derived from the orginal granite; on the other hand it is naturally almost wholly destitute of two other elements in which primary rocks generally fail, *viz.*, lime and phosphoric acid—substances indispensable to plant growth. The consequence is that agriculture is impossible without treating the soil with considerable quantities of lime and phosphatic manures; in its normal state, the soil supports only dense growths of ferns, heather, and broom. These latter die and decompose, and thereby give rise to an unnatural quantity of acid substances in the soil. From analyses made at the laboratory at Lézerdeau, it appears that on some soils in the neighbourhood of the school, fully two per cent of carbonate of lime would be required to neutralize their acidity. This, when put into proper figures, means an addition of 50 tons of limestone per acre for the first 10 inches of the soil. This fact has an enormous bearing on the agricultural enterprize of the district, and I shall have occasion to speak of it later on in its connection with the *petite culture* of Finistérre.

From its vicinity to the sea, the climate of Finisterre is very temperate; being directly exposed to the moist south-westerly winds from the Atlantic, it is moist and cloudy. The rainfall averages about 40 inches *per annum*. Unlike the South of France, droughts are unknown here, and consequently irrigation has much less significance in Finisterre.

The system of meadow irrigation at Lézerdeau is known as *irrigation par simple deversement*. In England it is known as the catch-meadow or hill-side irrigation; it finds a very limited place, however, in British agriculture. It is only possible, as its name implies, on the side of hills, or on lands having a sufficient slope. The source from which water is derived most commonly is springs, as at Lézerdeau; sometimes brooks, common enough in hilly districts, are perfectly adapted to being utilized for watering the lower slopes. The geology of Finisterre with its alternating beds of sand and clay, broken through by quartz veins, &c., is particularly favourable to the growth of springs. These either come up to the surface or as is most commonly the case, lie underground, where they betray their presence by a green moist appearance of the herbage above them, or very often by growths of rushes, sedges, and various other semi-aquatic plants. The manner of utilizing these springs, when once discovered, is very simple. At Lézerdeau, the springs are very shallow, probably not deeper than the first layer of sub-soil clay; they debouch mostly at the surface; when underground, they have been tapped by digging into their hearts. The issuing water is collected in a reservoir in the neighbourhood, often immediately over the springs. The construction of such reservoirs is very simple; at Lézerdeau, however, the State has gone to considerable expense to give them more durability than is usually their lot. The principle in any case is the same as will be seen in the diagram appended to the report (Fig I.)* It represents the position of a reservoir with its primary rigoles which carry away the waters to be distributed over the meadows. The dotted colour lines show the respective altitudes of different parts of the land. It will be seen that the right portion of the land at the top has much less slope than the corresponding portion on the left side. Such failures of slope on hill-sides favour the growth of moist patches which often degenerate into bogs or marshes—phenomena not very unfrequent in hilly districts. To render such land healthy, it has to be drained, as shown in the diagram. The main drain debouches into the reservoir, and so far it plays the part of a spring. Besides this, two springs have been shown at higher levels; they have been tapped and their water led into the general reservoir. Three other springs have been represented on the bottom of the reservoir; these form the main sources of supply. As to the construction of the reservoir, it consists simply in barring across the face of the valley, as is apparent from the figure. Some care is necessary in the building of the embankment in order to make it water-tight—a task which is not always easily or satisfactorily performed. At Lézerdeau, all embankments have been made of solid masonry, regardless of all expenses which such a luxury would entail. But where economy and not luxury has to be studied, it would answer equally well to build them with ordinary materials found on the spot, taking care, however, to put always a certain thickness of impervious puddle in the interior of the barrage. In all cases the foundation of an embankment should always lie in an impervious stratum, however deep it might be necessary to dig to get into it. The primary rigoles originate at the lowest part of the reservoir; the delivery is regulated by a *vanne* or sluice on the side of the embankment. (An elevation and section of a vanne of this kind in use at Lézerdeau are given in the plate appended to the report.) Above the primary rigoles, two smaller rigoles may be seen; these are mostly unnecessary, their only function being to water the strip of land which lies between themselves and the primary rigoles. A certain slope is always necessary in the rigoles to facilitate the flow of water, It is usually ·002 in the primary rigoles; but the slope varies according to the dimensions of the rigole as well as the object it is intended for.

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* We have not published the diagram.—Ed., I. A.

So far I have sketched as briefly as I could the source from which the water is derived, the formation of reservoirs and primary rigoles, and their general disposition with regard to each other. I have omitted all minor details, as these would only serve to encumber the report. I will now try to describe how the water which has been led away by a primary rigole is distributed over the soil.

It is evident from Fig I. that only those fields which lie below the primary rigoles are accessible to irrigation. When water flowing in a conduit traced horizontally on an inclined slope is suddenly arrested, it accumulates behind the stoppage, and eventually *déverses* itself, *i.e.*, overflows the lower lip of the conduit. This is the sole principle of the hill-side system of irrigation. There is a good deal of diversity in the formation and tracing of the rigoles of déversement.

For lands of average inclination, of which the slope does not exceed, I (1/10, a series of secondary rigoles—known as *rigoles of repartition*, at intervals of about 50 metres, originate in the primary rigole, and are directed straight down the side of the hill. The bottom of these derivatives is made about an inch higher than that of the primary rigole which can thus aliment several of them at a time. From the secondary rigoles of repartition, smaller rigoles of déversement branch out on both sides. The latter are traced almost perfectly horizontal; they are about 5 metres from each other. Fig. IV shows a portion of a meadow laid down in the way described above. Where the rigoles of repartition originate from the primary rigole, small vannes or sluices (V) are placed; the communication, however, between the former and the small rigoles of déversement is free, a small piece of plank, or stone or brick serving the purpose of a sluice at the time of irrigation. To begin with, the irrigator opens as many vannes (V) as the primary rigole can feed at the same time; he next arrests the downward flow of water by placing pieces of stone, etc., across the descending rigoles immediately below the first pairs of embranchments; the water is thus diverted into the latter, and soon begins to diverse itself by their inferior border. When the first strip has been thus watered, the irrigator replaces the stones at the second embranchments, which done, and the third ones, and so on, to the bottom of the meadow. It will be observed that any pair of the little rigoles of déversement serve as well as rigoles of evacuation for the pair immediately above it. When watering with a continuous current is desired as in winter, water being then very plentiful, the passages at the embranchments are half closed, so that the lower portion of the fields may still get some virgin water.

When the slope of a meadow exceeds ·/. the system indicated above is no longer applicable, as water would then flow with excessive rapidity in the descending rigoles, and thus it would be extremely difficult to divide it regularly in the horizontal rigoles of déversement. On such lands, the system of irrigation is very simple as will be seen in Fig. V. When water has to be carried over long distances (say) over 50 metres and more, the primary rigole is hardly used for déversement, as the flow of water is then too strong to allow of a uniform overflowing. In the latter case it gives rise to smaller rigoles which serve for déversement, as shown in Fig. V. For shorter distances, the primary rigole can serve as well for déversement. It is evident that with very broad meadows it would take a long time for the water to flow down the entire side; besides in thus flowing it would lose all its manurial value before it would reach the lower lands. Moreover, where the soil is very light and water is scarce, it is impossible to water the whole meadow by a single déversement. To avoid these difficulties parallel horizontal rigoles are traced at intervals depending on the slope and nature of the ground, (generally from 10 to 15 meters.) Each of these rigoles is fed either independently from the reservoir, or by the primary rigole at the top. They are quasi-horizontal, unless they serve as well to carry water to other parts, when a feeble slope is given to them.

On the school farm at Lézerdeau there are two large reservoirs, and 4 or 5 smaller ones. Irrigation begins with October, and is continued all winter and spring within the second or third week before mowing. In winter the reservoirs are usually full and waterings follow each other as closely as possible. In spring they are given at intervals the period of watering gradually shortening as water gets scarce and grass becomes ripe for mowing. Irrigation is stopped during the entire mowing season; a few waterings are given in summer between the mowings and pasturing, but they are too limited then, as water fails in this season.

The superior effects of irrigation are eminently striking at Lézerdeau, although the climate is very humid. The meadows afford two heavy mowings in the season and a subsequent autumn pasturage. Of the various beneficial results obtained on the farm it is none the less important to observe that irrigation has supplied one of the best means to get rid of ferns and other noxious weeds, as these cannot stand long waterings and soon give way to useful plants which then push up vigorously.

MORE ABOUT BIJOO (SEEDLING) MANGOES.

[BY DR. E. BONAVIA.]

SOME time ago (9th July 1885) a native friend sent me some "bijoo âm," (seedling mangoes). They were out and out the finest flavoured mangoes I had tasted that season. They were larger than the Bombay mangoe, of a pale yellow color inside, a little stringy, but the flavour was exquisite, a mixture of sweetness, with a little subacid, and just enough of that charming turpentiny aroma, to remind one he was eating a delicious mangoe, and not a delicious anything else. The whole was a "bouquet" of flavours, which I don't remember having experienced since I have been in India. All this was enhanced by the lateness of this variety, all others having ceased long ago. Natives have a pull over us. They don't eat mangoes with a spoon, but suck them. We therefore exclude from our palate some of the most deliciously flavoured mangoes, simply because they happen to be a little stringy. This 'bijoo,' and others of its stamp, are varieties truly worthy of being propagated and multiplied by grafting. Cultivation might lessen its stringiness, but it could hardly improve its charming 'bouquet.' The unfortunate accident of some varieties being called 'bijoo' and others 'kalmi,' (grafts) may have put a stamp of contempt on the former, and have led to their eventual loss by extinction for want of multiplying them by 'kalam.' Their caste name having stamped them with unworthiness of propagation by graft, while an inferior "kalmi," mangoe may have been propagated and petted and cared for, simply because it was a 'kalmi âm.' It is much the same with the epithets 'Desee' (country) and 'Bilaitee,' (English). The former means neglect, the latter attention, often irrespective of the quality of the two. It is difficult to convey any accurate idea of the combined flavour of the 'Bijoo" mangoe in question: one might perhaps convey some idea by saying it was like a mixture of pine-apple, custard-apple, nectarine and something else. with a finish *sui generis* mangoe flavour! The lesson to be learnt from this delicious 'Bijoo' mangoe, however, is that good *seedling* varieties of mangoes are as worthy of being propagated and multiplied by grafting, and of being manured, and cultivated, as any 'kalmi' mangoe, and in some cases, perhaps more so.

Miscellaneous Items.

We are told that Mr. Yasuda, of the Agricultural and Commercial Department, who is acting as Japanese Commissioner to the Inventions Exhibition in London, has written to the Government that the Japanese display receives the highest praise, and is eagerly visited.

It is stated by the *Japan Mail* that an analysis to determine the percentage of nicotine in tobacco grown in various parts of Japan has been made at the Tokyo Laboratory, when it was found that none contained more than 3 per cent. Nicotine in foreign tobaccos is frequently as much as 7 per cent.

The *Japan Mail* says:—The oft-repeated assertion that in the Hokkaido lie the hidden resources of Japan is being gradually realized. The most recent discovery is an excellent clay which has been found in the neighbourhood of Mombetsu. An official examination has proved it to be as good and as fit for the manufacture of porcelain as that found at Imari.

We (*Singapore Free Press*) are informed that the Exhibition Commissioners have allotted 5,600 square feet in the Eastern Arcade and Gallery of the Colonial Exhibition to this Colony. The situation is not very favourable as it is some way from the main entrance, and rather out of the ordinary course of visitors. The Committee have decided on applying to the Commissioners to remove the Court, if possible, to a more central position. It is hoped that a good number of exhibits will be got together during this month. It is proposed, if possible, to hold a public exhibition of the exhibits before they are packed for transmission to London. We have had the pleasure to see some models that are being made by Mr. Pickering, C.M.G., comprising a street of Chinese shop-houses, with a number of natives of different kinds walking along the road. The shops are of a large size, and suit the figures, which are about six to eight inches high. It is a marvel of patience and ingenuity. Mr. Pickering has also made a number of models of native boats with sailors and fishermen in them. It will be a thousand pities if they are sent to London before people can see them here.

Two special committees have been appointed for the purpose of buying remounts, for the Bengal and Punjab Cavalry, at the horse fairs in Upper India this cold weather. The North-West Provinces and Oudh Committee is composed of the following officers:—Colonel R. M. Clifford, 9th Bengal Cavalry (President,) and Major C. E. Salkeld, 2nd Bengal Cavalry, Major G. W. Deane, 13th Bengal Lancers (members); Veterinary Surgeon E. H. Kelly attached. The Punjab Committee consists of Colonel Seymour Barrow, President, and Major R. C Hutchinson, Corps of Guides, and Captain P. R. Barnsfather, 14th Bengal Lancers (members); Veterinary Surgeon R. Pringle attached. No remounts are to be bought for the native cavalry at any horse fair, except by these two Committees. The horses they buy will be assigned to the various regiments wanting remounts, by drawing lots. It is ordered that remounts otherwise fit for service are not to be rejected on the ground of colour. The North-West Provinces Committee will buy for the 2nd, 4th, 6th, 7th, 8th, 9th, 11th, 13th, 16th and 19th Regiments of Bengal Cavalry. The Punjab Committee is to buy for the 1st, 3rd, 5th, 10th, 12th, 14th, 15th, 17th, and 18th Bengal Cavalry, the 1st, 2nd, 3rd and 5th Punjab Cavalry, and the Guides Cavalry.

The Department of Agriculture and Commerce, says the *Japan Mail*, has taken a step which may be regarded as supplementary to the inauguration of Tea Associations last year. Inspectors are to be sent to the tea and silk districts for the purpose of suggesting improvements in methods of cultivation and preparation, and urging greater precautions against adulteration. We judge from this that the Government deem it necessary to extend their paternal role, for which judgment they will be roundly condemned by some foreign critic. It may be observed, however, that if official aid is to be rendered to agriculturists at all, it could scarcely assume a less objectionable form than that now proposed. Assuming that the inspectors chosen by the Government will be men well versed not only in the processes of sericulture and tea-production, but also in the conditions of the foreign trade in these staples, they will be in a position to give the people much useful advice, without resorting to any vexatious interference. One excellent task which they may set themselves to perform, is to preach everywhere the substitution of mulberry plantations for rice-fields, and, indeed, the general abandonment of rice-growing throughout the land. Nothing is more essential than this if the Japanese race is to be ameliorated. There is no form of agriculture more degrading and unwholesome than the cultivation of rice, and there has never yet been a nation which rose to real eminence on a diet of rice.

Selections.

TRADE OF RUSSIAN TURKESTAN.

The Russian official paper entitled the *Journal of the Finance Minister* has just published the following highly important and interesting article on the progress of the trade and industry of Turkestan. We print a translation of the whole of this contribution to our knowledge of Russian Central Asia:—

Since 1864 the administrative frontiers of Turkestan have undergone several changes. At the very first the jurisdiction of the Governor-General extended only over the districts of the Sir Daria and Semiretchinsk which together covered about 750,000 square versts, for the most part consisting of barren steppe. But before long several conquests gave Turkestan more fertile possessions. In 1868 there was added to the two districts named the province of Zerafshan, a fertile valley through which passes the river of the same name. Between 1871 and 1873 Kuldja was next annexed in addition to that part of Khiva which lies on the right banks of the Amu Daria. Finally, in 1875-76 the territory of Ferghana, or the old khanate of Khokand, was joined to Turkestan, so that in 1877 Turkestan had an administrative jurisdiction of 1,032,500 square versts and a population of 3,150,000 persons. Still later on a separate government was formed in 1882 for the steppes, comprising the district of Semiretchia, and then the administration of the Governor-General of Turkestan was confined to the districts Sir Daria, Ferghana, Zerafshan, and Amu Daria, or about 610,000 square versts, with a population of 2,335,000. This territory touches on the south and west the khanates of Khiva and Bokhara, and the Chinese possessions in Kashgaria on the east, while to the north it is bounded by the Governorship of Orenburg. The present territory of Turkestan may thus be divided:—

		Extent in in Sq. Versts.	Settled Population.	Nomad Population.	Total Population.
Sir Daria	...	416,750	5 0,000	654,000	1,154,000
Ferghana	...	85,000	540,000	150,000	690,000
Zerafshan	...	23,250	360,000	...	360,000
Amu Daria	...	86,000	30,000	101,000	131,000
Total	...	611,000	1,430,000	905,000	2,335,000

The atmospheric conditions and the character of the soil present striking contrasts throughout this vast region. A sandy soil very imperfectly watered by the Sir and Amu Darias rivers which have no affluents, and by the Aral Sea, stretches to the north. The steppes between the two rivers named are covered with thin herbage, without the smallest trace of a forest, and they are remarkable for their barrenness, and can only be utilized for pasturage by the nomads. In the south and east numerous branches of the Tian Shan range form a district watered by countless streams and rivers, with a fertile soil and having a rich vegetation of grass and trees. This portion of Turkestan embraces part of Ferghana, Zerafshan, and Kuraminsk and Khodjent, both in the sub division of Sir Daria. Its numerous valleys and hills offer the greatest advantages for purposes of cultivation, while the summits of the mountains are equally suitable for pasturage. The settled population occupies, in particular, the hilly districts, while the nomad tribes are scattered over the vast Sir Daria and Amu Daria steppes. Of these the Kirghis are the most numerous, and they may be computed at 600,000. Before the annexation of Turkestan the nomad inhabitants formed two-thirds of the population, now they are less than half. The settled population presents a great variety of races, Iranian, Mongol, and Turk. The most important of these are the Sarts, [illegible]; the Usbegs, 200,000; the Tajiks, 150,000; and the Dungans, 25,000. In the towns are also to be found Hindoos, Persians, Arabs, and Jews. The town population is reckoned to be 40 per cent of the whole settled population. Among the principal towns are—Tashkend, 87,000; Khodjent, [illegible]; Khokand, 34,000; Andijan, 28,000; Namangan, 16,000; and Samarcand, 35,000.

The centre of industrial production in Turkestan is of very limited extent in the mountainous part of the province. Its productions are known in the European market as articles of Tashkend and Central Asia. The trade, properly speaking, distinguishes between different articles, as those of Khiva, Bokhara, and other places, although the articles may be made elsewhere. Both the rural and manufacturing organisations have special features peculiar to Oriental countries. In the rural economy small properties producing a little of everything predominate, and in the same manner in the world of commerce there is not a single house which devotes all its attention to the production of a single article on a large scale. Even the cultivation of cotton is carried on side by side with that of other objects of agriculture. A large part of the arable land is used as meadow, and the cultivators are in the habit of transferring cultivation to fresh lands, in order not to exhaust the soil. Almost everywhere lands under cultivation are irrigated by means of canals. Of 61 million deciatines (the tenth part of their area) 28 are considered incapable of cultivation, and even of being used as pasturage. Thirty millions are only suited for pasturage, and of the remaining three millions, two millions are under cultivation, and one million is used as meadow land. The richest agricultural districts are in the plains of Ferghana, Zerafsh, Tecetchirk, and Angrena, which cover about one million deciatines. Wheat and rice are the chief grains under cultivation. Barley, millet, and other grains occupy a secondary place. Among textiles, cotton comes first, then flax and hemp. Market gardening is also very general, particularly in melons and water-melons. Since the establishment of Russian colonies, the cultivation of the potato has rapidly increased. The following statement shows the average annual production of lands under cultivation in thousands of pouds:—Rice, 10,000; wheat, 17,000; djongara, 8,800; millet, 5,400; barley, 3,100; other cereals, 3,600—total 47,900,000 pouds. The nomads themselves raise annually about three million pouds of corn. The cotton crop in the districts which have been named is estimated at 400,000 pouds. In Ferghana 150,000 pouds are raised in addition. The cultivation of American cotton has been begun, and already about 600 deciatines have been planted with it. Horticulture is another important branch of rural enterprise, and occupies about 100,000 deciatines. The vine, apple pear, plum cherry, walnut, and mulberry trees are the most numerous in the orchards. The dried fruits of Turkestan are sent to the most distant markets of Siberia and into the southern parts of Russia. Vine culture is steadily increasing, but does not as yet suffice for more than the local consumption.

Sericulture is the principal industry. It is particularly active in Ferghana, which produces 15,000 pouds of silk annually; in Zerafshan, 10,000 pouds, and Khodjent, 3,000 pouds. Chimkent produces 2,000 pouds. Bokhara makes 60,000 pouds of silk, Khiva 3,000, and Kashgar 10,000; so that the total quantity manufactured in Central Asia is about 103,000 pouds. At the rate of 125 roubles per poud, silk gives an annual revenue of about 13 millions roubles. The raising of cattle forms the exclusive occupation of the nomads. Among the most numerous animals are goats, horses, camels, and horned cattle. The present number of animals in Turkestan is computed to be—goats and sheep, 4,810 000; horses, 645,000; camels 382,200; horned cattle, 525,000—total 6,362,200. Fishing, to which the Russians at the mouth of the Sir Daria, near Kazalinsk, and in the Aral Sea, are specially devoted, provides an annual return of about 100,000 roubles. Furs of the wolf, fox, and marten bring in about 550,000 roubles. The mineral riches of Turkestan are not yet developed, with the exception of some oil wells near Khodjent. These yield about 750,000 pouds of oil per annum. The towns of the elevated part of the province are the seats of manufacture. Turkestan is so rich in natural productions that only native articles are used. Before the establishment of Russian power the industries were limited to those produced by hand labour, and the inhabitants employed their leisure in agricultural pursuits. There are now 1,662 factories, or rather workshops, divided as follows:—

	Work-shops.	Work men.	Annual production in roubles.
Sir Daria	720	3,000	1,400,000
Ferghana	420	2,000	800,000
Zerafshan	520	1,000	600,000
Amu Daria	2	50	50,000
Total ...	1,662	6,050	2,850,000

The most important factories belonging to Russians are 40 in number, of which 12 are spirit distilleries, with a production valued at 500,000 roubles; five are tobacco factories; seven leather; two for cleaning cotton; one oil; and one glass. Among the numerous small native workshops, those for thread and silk are the majority. Those of Ferghana alone produce more than a million roubles' worth of silk, and about 300,000 roubles' worth of cotton goods. It is impossible to compute with any accuracy the production of tissues in other localities, but it is extremely active in every family, which annually supply a large quantity of cotton cloth for the army. It is also impossible to state with strict accuracy what the commerce of Turkestan amounts to. The business transactions of the three principal towns, Tashkend, Khokand, and Samarcand, are estimated to reach ten million roubles, but this estimate probably falls far short of the real truth. The following table may approximate to the external trade of Turkestan:—

EXPORTS.	Roubles.
To the Fair of Nijni Novgorod	5,000,000
To the Fair of Irbit	500,000
To the Fair of Krestovsky	500,000
To the Fair of the Steppe	1,000,000
To Orenburg and Orsk	1,300,000
To Troitzky	1,000,000
To Petropaulovsk	500,000
To Semipalatinsk	1,000,000
Total	10,800,000
IMPORTS.	**Roubles.**
From Orenburg and Orsk	5,500,000
From Troitzky	2,000,000
From Petropaulovsk	1,500,000
From Fairs of the Steppes	2,000,000
From Semipalatinsk and Semiretchinsk ...	1,000,000
Total	12,000,000

Besides these avenues of trade Turkestan is in constant commercial relations with Khiva, Bokhara, and Chinese Kashgaria. The export of Turkestan to these countries amounted last year to six million roubles, while the import was 5,700,000. Since 1866 the commerce of Turkestan has doubled. Among the articles exported to it from Russia in Europe are cotton manufactures, linen, and fancy articles. Turkestan sends back in return cattle and about a million roubles' worth of Indian tea.

AN INTERESTING AGRICULTURAL EXPERIMENT.

[FROM A CORRESPONDENT.]

Of the two explanations as to the meaning of the word "dirt," the scientist's that it is matter out of place and the sharp child's that it is "mud with the wet squeezed out," the former is about to receive a practical exemplification, as far as Bombay is concerned, in the proposed utilization of the city sweepings for the manufacture of artificial manure. The invention is the idea of Dr. S. Cooke, of the College of Science, Poona, who has secured a patent for his system. I have had an opportunity of inspecting the article which is put up in large or small blocks as desired. It is a grey porous substance somewhat resembling pumice stone, but is much more friable; in fact, one of its inventors' claims is that it can be very easily reduced to powder and drilled into the ground with seed at the time of sowing. Dr. Cooke has a convincing proof of the efficacy of his invention in his garden. Five plots of ground of equal area have been planted with the same quantity of *nachnee*. The first plot has been left unmanured, with the result that the weeds have decidedly the upper hand. Plot 2 was dressed with wood ashes, the result not being very satisfactory. Plot 3 was fertilised by the ordinary process of *rab*, two experienced hillmen coming especially to do the work. The result of this treatment of the soil was an average crop, such as may be seen on the ordinary Hill Farm. Plot 4 was worked with partially burnt horse manure, the result being that too much heat was generated which destroyed part of the seed, leaving what did come up very good, however. Plot 5 was the patent fertiliser drilled in with the seed, and the result is simply astonishing. Whereas, the average height of the plants on the other beds was about 14 inches and the colour of the stems varying from light to medium green, the stems and leaves in this plot were of the darkest and richest green, and of a height of about two feet with magnificent heads of seed. As far as can be judged from an experimental growth under favourable conditions, the result is most conclusive, and there should be, if not "millions," at least "thousands" in the invention. As regards the manufacture on a large scale of this fertilizer, it is to be encouraged irrespective of its agricultural aspect, because it furnishes a means of solving what is becoming daily a most serious problem: namely, the disposal of street sweepings, which in large cities and even in small towns in hot climates, necessitates much thought and care, to render the operation of removal harmless and unnoticeable, a result not yet obtained in Bombay, where the Municipality have to grapple with the serious problem of removing the enormous quantity of nearly 400 tons daily. Eight hundred cubic yards of refuse are daily carted from Bombay, and the question is coming prominently forward, "What are we going to do with it?" At this moment Dr. Cooke comes to the front and proposes that a company be formed to take over the entire sweepings and convert them into a useful and powerful agent for good. The company, if formed, would thus stand in that rare but enviable position of public benefactors, while at the same time having the monopoly of a very money-making speculation. The method of manufacture and the results of the experimental crops have been seen by most of the principal Revenue and Forest officials, and both the simplicity of the former operation and the results of the latter have drawn forth the unqualified approval of the many experienced gentlemen who have visited the scene of operations. For the manufacture is required—a furnace for reducing the sweepings to ashes, a kiln for obtaining lime, and a mill for roughly grinding bones.

The three materials thus obtained are then put into pits in layers of ashes, limes and bones, water is then poured into the pit, and layers of fresh materials introduced as the contents sink, and in about two weeks the result is a pasty mass, consisting almost entirely of salts best adapted for replacing the productive power of poor soils. By mixing charcoal with the raw materials a fertilizer can be produced especially adapted for gardens. As a proof of the commercial success of an undertaking of this kind, it is known that the sweepings of Manchester, Birmingham and other towns in England are readily disposed of at prices varying from £4 to £6 a ton. Chemical manure is exported in enormous quantities from Liverpool at £12-10 a ton. Taking into consideration the cheapness of the raw materials here, a company should make a large profit at Rs. 20 per ton, and above all it would be a great blessing to Bombay to have the mass of refuse innocently converted into a harmless inodorous compound, instead of being a source of danger and unpleasantness to every one.—*Times of India.*

RATES AND METHODS OF SOWING WHEAT.

RESULTS OBTAINED AT THE INDIANA AGRICULTURAL COLLEGE.

It is pretty well known that the quantity of seed per acre will depend on several conditions, among which may be named the character of the soil, preparation of the seed bed, time of sowing and kind of wheat. It may not be so well known that the season also exercises a strong influence. The experiments at the college with

THICK AND THIN SEEDING

shows clearly that thick seeding gives the best results when the winter is very severe. In the fall of 1883 a series of plats, extending entirely across the wheat field, were drilled in at various rates as given below, and in 1884 the experiment was repeated. Fultz wheat was sown on plats both years. The result were as follows :

SEED, ONE TO EIGHT PECKS TO THE ACRE.

No.	Rate. Pecks.	Yield per acre, bushels.— 1884.	1885
1	1	*	7 7
2	2	24·6	16·4
3	3	33·5	25·3
4	4	35·5	29·1
5	5	31·8	32·1
6	6	34·8	33·4
7	7	*	32·1
8	8	*	34·8

* Rates not sown in 1881.

In 1883-4—a favourable year—there was a little increase from sowing, more than three pecks to the acre. The entire field that year averaged 25·5 bushels with a seeding of five pecks to the acre. In 1884-5 the thinly seeded plats had a slight advantage in location and richness of soil. Notwithstanding this fact the yield rapidly increases, with the increase of seed up to five pecks ; and the plats receiving eight pecks gives the highest yield. The rest of the field in which these plats are located, was sown at one bushel per acre with an average yield of 18·6 bushels. The preparation of the seed bed was very thorough both years and the soil had rather more than average fertility. The thick seeding passed the severe winter and spring with the least damage. Could we know beforehand that the next winter would be as severe as the last we should sow thickly—say six pecks to the acre. In the absence of this foreknowledge, we should sow again only one bushel per acre. On poorer soil and with less thorough preparation than we give, we would recommend five or six pecks of seeds to the acre.

BROADCAST AND DRILL SOWING.

A plat extending across the wheat field was seeded with broadcast seeder attached to the waggon. On either side was a plat of the same size seeded with the drill. The aim was to sow the three plats at the one bushel rate, but the broadcast seeder could not be accurately gauged and sowed not less then five pecks to the acre. The yields per acre were :

	Bushels.
Plat 1, drilled	17 0
Plat 2, broadcast	17 3
Plat 3, drilled	20 9
Average of the two drilled plats	18 95
Grain per acre by using drill	1·65

If the broadcast seeder had deposited only one bushel per acre, as did the drill, I think the difference would have been more strongly in favour of the drill.

The drill secures greater uniformity in rate of sowing and depth of covering. The broadcast seeder will do more rapid work, but is better adapted to the broad farming of the west than to this state.

CULTIVATION OF WHEAT.

A small piece of ground was seeded, last fall, in drills two feet apart. One-half of the area was sown at the rate of one-half bushel to the acre, and the other half at two-thirds bushels per acre. During the growing season this year both plats were thoroughly harrowed three times, between the drill rows. The ground was rich and well prepared before sowing. The wheat made a strong growth in the fall and passed the winter and spring with very slight damage. There was of course a rank growth this season, which caused the wheat (Velvet Chaff) to lodge some before fully ripe. The grain was well filled, however, but the harvesting was rather difficult and the wheat was not quite all gathered. The yields per acre were—

	Bushels.
Plat 1 sown ½ bushel per acre	32 05
Plat 2 sown ⅔ bushel per acre	32·18

The experiment will be repeated next year on a part of the field crop, and with a wheat possessing stiff straw. We draw no conclusions from this experiment for the present, but would suggest that other farmers try the experiment of harrowing a portion of their wheat and report the results to the *Indiana Farmer*.

W. C. Latta,
Prof. of Agri., Purdue University, Lafayette.

—*Farmer's Review.*]

THE ELECTRIC TREE OF NEW GUINEA.

We have received the following from a correspondent who is usually reliable, but whose account of the discovery of the Electric Tree is so startling that we almost hesitate to believe him in this instance. We therefore publish the narrative of this marvellous discovery "under reserve." :—

"One of the German expeditions to New Guinea has just made a startling discovery. It has, of course, been perfectly well known, and is indeed one of the great principles of modern science, that force, or energy, is not only indestructible, but transformable, as, for instance, the heat energy of steam is transformed into the energy of visible motion by the steam engine, and that again into the form of energy which we call electricity, by the dynamo. So, again, it is, of course, familiar that the peculiar force, whatever it is, which we call vital is partly transformed into weak electric currents along the nerves of men and other animals, an extreme instance occurring in the well known electric eel which gives a really powerful discharge of electricity. Now, hitherto in plant-life nothing of the sort, however possible, has been proved to exist, and the New Guinea discovery is neither more nor less than a gigantic vegetable gymnotus. The scientific interest of the find is immense, and not less, probably, its future practical bearing on the lives of our descendants. The electric eel could scarcely be used as a regular source of electric currents, but the *Elsassia Electrica*, as Dr. Kummel has patriotically named it, can, to all appearance, be readily acclimatised and cultivated, and, if not overdrawn on, will give, if one may use the expression, a steady crop of energy available for all the multitudinous uses, for which modern civilisation now uses the dynamo or the battery. It is true that the current given by one tree is, though considerable in quantity, of much lower intensity than is wanted for many purposes ; but even if it is found that this defect cannot be remedied by coupling up a number of trees in series without damaging them, science has methods of transforming, with little loss, larger weak currents into smaller strong ones, and there need be no difficulty on this score. The outlook is immense : parks which will form a pleasant recreation ground to the citizens will light our cities almost free of cost or care ; our gardens will themselves illuminate the villages of their owners, whilst the very hedge-row trees on our farms will supply the power for agricultural operations in the fields which they surround. I purposely refrain from the greater question of the application of electricity from this source to the general supersession of steam and other motors, but that it will come I have little doubt. However, I have said enough both on the theory and the prospects of the discovery, and cannot now do better than relate in his own words the account given me by Lieutenant Von Immer Gassende, the fortunate discoverer, who is now on his way to Sydney, where he catches the French mail steamer, the *Salazie*, on the 6th October and proceeds to Europe. The Lieutenant, though much pulled down by the dangerous fever he has had, and which is indeed the cause of his return home, is anxious to be again in New Guinea, and to pursue those explorations which have been already so fruitful in result. He is a fine type of the German gentleman and sailor. He said—"It is unnecessary to trouble you with many details of our journey. Dr. Kummel and I, with some half-a-dozen men, left the ship at anchor in a small bay to the east of Cape Della Torre, and at once commenced working our way, as nearly due south as we could manage, over the low jungle-covered range which here skirts the coast. We saw for the first two days a few natives of the type prevalent in this part of Papua, with small patches of bananas and other cultivated ground ; we were not, however, molested by them, and further on the country seemed absolutely without inhabitants. When we had got some 100 miles inland, a journey which took no less than twelve days' hard work, and had reached an elevation of about 5,000 feet, being, in fact, on one of the northern spurs of the great central range, we encamped for the night in a more open country than we had hitherto seen. Our way in the morning was on an ever ascending slope through park like scenery, not only beautiful

Holloway's Ointment and Pills.—Outward infirmities.—Before the discovery of these remedies, many cases of sores, ulcers, &c., were pronounced to be hopelessly incurable, because the treatment pursued tended to destroy the strength it was incompetent to preserve, and to exasperate the symptoms it was inadequate to remove. Holloway's Pills exert the most wholesome powers over the unhealthy flesh or skin, without debarring the patient from fresh air and exercise, and thus the constitutional vigour is husbanded, while the most malignant ulcers, abscesses, and skin diseases are in process of cure. Both Ointment and Pills make the blood richer and purer, instead of permitting it to fall into that poor and watery state so fatal to many labouring under chronic ulcerations.

in itself, but a very refreshing change from our previous experiences. Towards noon I stopped under a large tree which seemed to particularly attract the attention of Kummel, who had been finding all kinds of novelties the whole morning, to take the exact bearings of a high peak which was visible through an opening in front of us. To my surprise, the compass seemed utterly drunk, varying in all directions in the most capricious manner at each movement I took. I called Kummel's attention to this, and he said jokingly that we must have arrived at Sindbad's loadstone rock. I tried a variety of experiments, and found that, on walking into the open, the disturbances became feebler, but did not entirely cease for some distance. Whilst we were discussing the matter, one of the men, who carried a heavy cutlass or machete for clearing the path, struck one of a number of peculiar buttresses which ran up the outside of the tree, splitting off a large slice, and severing a curious-looking black core some half an inch thick, which formed the centre. Kummel, in his scientific curiosity, ran up, placed his hands on the two ends of the core to look at it more closely, and instantly, to my utter astonishment, gave a yell and rolled head over heels, getting up without his spectacles, and stammering to me that he had had a severe electric shock. One of the men was induced to repeat the experiment with similar results. I had no galvanometer, but improvised one with a length of copper wire, the centre of which I formed into an open spiral round my compass, and on inserting the ends of the wire into the opposite sides of the black matter, the needle was violently deflected, showing conclusively that a very considerable current was passing. Every branch and every twig of the tree, which I can assure you we treated with much respect, presented similar ridges and cores, with the addition of a thicker central one, and I quickly proved that the current circulated through the entire system. How it is kept up, no one can at present tell; but there it is. I am not able to say what the intensity or the quantity of the current might have been, but it was enough to knock you down in a very unpleasant way. We made a lot of more experiments on the tree, and would have cut it down, but it seemed a dangerous job to undertake. We saw a great many more of the same kind farther on, quite a forest, in fact; but I was that night attacked with very severe fever, and, after stopping several days to rest, I found myself obliged to return to the ship, and was then invalided home as my only chance. Dr. Kummel has returned with instruments to take proper measurements of the current, and to satisfy himself as to a number of points. In the meantime, I take home a preliminary memoir, pieces of the wood and core, &c., and seeds which we were fortunate enough to obtain. I am sorry I cannot show you them, as they are in my boxes on the steamer. The chemist on board says the black substance is a very pure amorphous carbon, giving hardly a trace of ash. Dr. Kummel is much puzzled to account for the existence of this singular tree by any process of natural selection. He says he cannot see how the possession of this system of electric currents could have benefited it. It has certainly however, cleared out nearly every other species of forest tree from its *habitat*. Yes, I sincerely hope *Elsassia Electrica* will grow in other countries; it would be a great thing, would it not?" The Lieutenant was obviously inclined for more conversation, but his time was up for the steamer, and I was reluctantly compelled to let him go with my thanks and best wishes on his voyage. We shall hear much more of *Elsassia Electrica*.

ENEMIES OF THE SUGARCANE.

In India little or nothing has yet been done in the way of protecting its agriculturists from the losses caused by insects. There is a school of forestry at Dehra, and the instruction given there includes some account of the insects useful or hurtful to man, and his industries, and we see references as to individual insects from time to time made to Mr. Wood-Mason. Some years ago Mr. Thompson, of the Forest Department, contributed a valuable pamphlet on the enemies of the forest trees; Mr. Haldane's "All about Grubs" mentions several beetles which injure the coffee shrubs; and Mr. Nietner in Ceylon and Dr. Bidie of Madras have added considerably to the existing information regarding them. But India has no reports or compendiums such as in England periodically issue from Miss Ormerod's pen, and the first attempt to furnish a general view of the Indian agriculturist's insect foes has been given in the "Cyclopædia of India," the third edition of which was mentioned in our issue of July 6. Yet the tillers of the soil of India are skilful, hard-working husbandmen and gardeners, but they are great sufferers from blights, and their patient toil should win for them all the care which the scientific skill at the command of Government can bestow. They are in many tribes and of different races, the farmers of recognised superiority being the Chasa and Khisan of Bengal, the Kunbi and Kurmi of the Western and Northern Provinces, the Tamil Vellalar, the Teling Reddi, Kapa, and Kama, and the Canarese Wahala, the finer garden work being carried on by the Tota-Kara, the Mali, the Kach'hi, the Lodha, and others. We have been led to these remarks by the perusal of a pamphlet on "The Animal Parasites of the Sugarcane," by Hy. Ling Roth (Trübner & Co.). The cane is to be seen growing everywhere throughout British India, and, although used by the people more as a fruit than for sugar-making, takes a prominent place among their garden plants. It receives from them great care, for it is a costly plant to grow, occupying the grounds for many months, requiring a rich soil, with plenty of manure and abundance of water. It is liable to be attacked by several insects, and if, from boisterous winds, the tops become twisted, the growth is checked and the cane rots. The planters of the West Indies, South America, the Mauritius, and Australia, have given much attention to the investigation of the diseases and injuries of the cane, and Mr. Roth has done good service to the planting industry and to science by summarising all that is known of its animal parasites. An examination of growing cane exhibits a variety of animal life which is simply marvellous; and the planter who thinks little of a single parasite ignores two important facts: firstly, that parasites breed most rapidly; and, secondly, that myriads make up for want in individual size. Mr. Roth tells us that a species of Hoplosternus is the common chafer of Queensland. Its grub destroys the roots of the cane, causing the leaves to become brown and dry up; the growth of the cane is then arrested, and the first high wind knocks it over. In this manner whole fields of cane are killed. In the early stage the larvæ are occupied in gnawing the roots. In November and December the chafers, fully developed, appear above ground in swarms, inactive during the day, but feeding eagerly at night. An ant, the Formica saccharivora, is supposed to get at the sweet juices of the plant and injure it. Another insect, the waxy sugar-cane louse, is known to the Mauritius and Bourbon planters as Le Pou a Poche Blanche. It is the Icerya sacchari, and occurs also in Queensland, and Mr. Roth supposes that it is milked by a small black ant, Formica rufo-nigra, in the same manner as species of aphides are by other ants. He considers the Pou to be a cause of *very great injury to the cane. The cane has its enemies in other countries.* The sugar-cane beetle of the United States is the Ligyrus ruficeps, *Le C.* It is a stout black beetle, half an inch long, which bores into the stalk of the sugar-cane under ground.

Sugar cane ravages in Grenada are caused by the cane-spittle fly Delphax saccharivora; in Natal by the cane smut Ustilago sacchari, a disease analogous to the smut of wheat and maize; in the Mauritius by the Proceras sacchariphagus, which Mr. Westwood has supposed may be identical with Diatræa sacchari; *Guilding* and Phalæna sacchari, *Fabricius*. The Borer of the Queensland planters has been supposed to be the larva of this Diatræa sacchari. It enters the cane above ground and eats up the heart. It is supposed to be identical with the Borer of the Mauritius, the Proceras sacchariphagus. The wire-worm, larvæ of the click beetle, are found at the roots of the Queensland cane, but no damage from them has been detected.

Many suggestions have been made for the destruction of these and other insect pests. In this country Miss Ormerod is devoting herself to the investigation of the field and garden and forest enemies of the vegetable kingdom, and has suggested several means for preventing or lessening the severity of their attacks. It has lately been said that many insect marauders are killed or scared away by a kerosine emulsion; a gallon of kerosine is mixed with three pints of water and a pint and a half of milk, and churned into a butterine consistence. This is diluted with twelve and sixteen times its weight of water, and has to be at once applied, because the component parts separate if allowed to stand. W. Bancroft, writing in 1878, mentioned that he had with advantage sown the Dolichos lablab and Cajanus Indicus pulse among the sugar-cane fields, with the object of attracting the Ichneumon flies which destroy the cane louse. On the lands which are cultivated on the rotation system all parasites have to seek fresh feeding ground once a twelve-month or oftener, and are thus kept away for a considerable period, or left to die in the absence of their special food. And the protection of insectivorous birds and bats has been recommended, with the hope of keeping down the pests by their means. The smut and rust, and yellow blast and black blast are planters' names for diseases of the cane which need scientific investigation.—*Overland Mail.*

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

THE disease commences with a slight derangement of the stomach, but if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints; but if the reader will ask himself the following questions, he will be able to determine whether he himself is one of the afflicted:—Have I distress, pain, or difficulty in breathing after eating? Is there a dull, heavy feeling, attended by drowsiness? Have the eyes a yellow tinge? Does thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste? Is the tongue coated? Are there pains in the sides and back? Is [illegible] a fullness about the right side as if the [illegible] were enlarging? Is there costiveness? Is there vertigo or [illegible]ziness when rising sudde[illegible] from a horizontal position? [illegible]ecretions from the kid[illegible] scanty and highly coloured, with a depo[illegible]ter standin[illegible] Does food ferment soon after eating, accompanied by [illegible] or a belching of gas from the stomach? Is ther frequent palpitation of the heart? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one of long standing, there will be a dry, hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty, brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantity of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market-Place, Pocklington, York, Oct. 2, 1882.

Sir,—Being a sufferer for years with dyspepsia in all its worst forms, and after spending pounds in medicines, I was at last persuaded to try Mother Seigel's Curative Syrup, and am thankful to say have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same complaint to give it a trial; the results they would soon find out for themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. TURNER.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

St. Mary-street, Peterborough, Nov. 29, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,

Mr. A. J. WHITE. WILLIAM BRENT.

Hensingham, Whitehaven, Oct. 16, 1882.

Mr. A. J. WHITE.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) JOHN H. LIGHTFOOT.

August 15th, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.—Yours truly,

(Signed) N. WEBB,
Chemist, Calne.

Mr. WHITE.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer describes it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Signed) VINCENT A. WILLS,
Chemist-Dentist,
Merthyr Tydvil.

To Mr. A. J. WHITE.

Preston, Sept. 21st, 1883.

My Dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said, "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully; in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.—I am, dear Sir, yours faithfully,

(Signed) W. BOWKER.

To A. J. WHITE, Esq. (A)

SARSAPARILLA.

WILKINSON'S

ESSENCE OR FLUID EXTRACT OF RED JAMAICA

SARSAPARILLA

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A WEEKLY

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VOL. X.] CALCUTTA:—SATURDAY, NOVEMBER 7, 1885. [No. 45.

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 28TH OCTOBER 1885.]

Madras.—General prospects fair; continue favorable in Bellary and Anantapore.

Bombay.—River still falling in Sindh. Rain but generally light in parts of the Deccan and Southern Mahratta Country; more required for *rabi* crops in parts of Nasik, Khandesh, and Panch Mahals. *Kharif* harvest and sowing of *rabi* crops in progress in most districts; standing crops damaged by blight in parts of Ratnagiri. Cholera and fever in parts of thirteen; cattle-disease in parts of ten; and small-pox in parts of four districts.

Bengal.—Rain has been general in Bengal Proper, Orissa, and Chota Nagpore, but in Behar slight rain has fallen in a few places only. Prospects of *aman* and other standing crops are generally favourable, except in the inundated tracts previously reported, and in places in Behar, where want of rain is much felt. Sowing of *rabi* crops is in full progress, and the crops already sown are doing well. Price of rice has generally fallen a little. Fever is prevalent in many places, but the general health on the whole is fair.

N.-W. Provinces and Oudh.—Weather seasonable. A little rain is needed in some places for crops on highlands. *Kharif* outturn is fairly good, and *rabi* sowings are in progress. Markets are well supplied, and prices generally steady. Cases of cholera and fever continue to be reported from a few districts.

Punjab.—Slight rain in the Dehra Ismail Khan district. Fever still prevalent in the Hissar, Delhi, and Peshawar districts; health elsewhere generally good. *Kharif* being harvested; *rabi* operations in progress. Prices stationary.

Central Provinces.—There has been a good fall of rain in Raipore, which has greatly improved prospects, and these are now favourable everywhere. Prices steady. Fever prevalent in a few districts.

British Burmah.—Cholera slight in three districts, elsewhere public health good; cattle-disease prevalent in one district, slight in six districts, elsewhere health of cattle good. Crop prospects good, except in Thayetmyo and Prome where more rain is required.

Assam.—Weather seasonable. Public health fair; cattle-disease still in some villages. Ploughing operations for mustard and *matikalai* progressing; prospects of crops good. Insects are reported as doing injury to crops in parts of the Sylhet district; tea doing well. Common rice 14 seers 8 chittacks per rupee.

Mysore and Coorg.—Standing crop in good condition in the Bangalore district; lands are being ploughed for *vysak* paddy cultivation, and a few more good showers are needed for dry crops. Prospects of the season and public health good; 3 cases of cholera reported from the Shimoga district; cattle-disease continues in affected parts of the Malnad district; otherwise cattle in good condition. Prices gradually falling.

Berar and Hyderabad.—Weather clear. Cotton-picking progressing; *kharif* crops good; *rabi* sowings continue. Wheat 22 and *juari* 26 seers per rupee in Amraoti. Fears are entertained of damage to standing crops in Hyderabad; *rabi* sowings postponed on account of rainfall. General health fair. *Prices* in Hyderabad—wheat 18, coarse rice 12½, white *juar* 19½, yellow *juar* 24½, and *tur* 15¼ seers per current sicca rupee.

Central India States.—Weather seasonable. 65 cases of cholera and 29 deaths in town of Rewah, otherwise public health good. Sowing of opium commenced, prospects good. Prices falling.

Rajpootana.—Fever still prevalent in Abu. Tanks, wells, and health good in other parts. *Til* not yet out. General health much better in Marwar, where cholera has disappeared. Crops suffered much for want of rain. Prices rising; rice crop lost in Kherwara, where there has been sufficient rain for *rabi* sowing. *Kharif* outturn one-half in Haraoti, where rain is urgently needed for *rabi*. Fever prevalent here also. Cholera continues bad in Partabghur district. *Rabi* sowings progressing in Ajmere, where there is slight sickness. Tanks drying and wells decreasing in Dholepore. *Kharif* crops damaged in Kerowli, where fever continues. Prices rising. Prospects fair. Health good generally, and prices, except in some places, are steady.

Nepal.—Weather clear and cool. Cutting of rice actively progressing.

Letters to the Editor.

TEA-PLANTING.

TO THE EDITOR.

SIR,—I strongly advise "A Would-be Planter" to apprentice himself on a tea-garden in Darjeeling or Assam for *at least* a year, unless he is inclined to follow your sound advice, *viz.*, "not to launch into tea cultivation with such entire ignorance of the subject."

A QUONDAM TEA-PLANTER.

TOBACCO-CURING AT POOSAH.

TO THE EDITOR.

SIR,—I regret to learn from a letter addressed by the Director of Agriculture, Bombay, to a Parsee gentleman, that apprentices are not admitted into the Poosah farm by Messrs. Begg, Dunlop and Co., the proprietors of this tobacco-growing and curing concern.

S. DATTA.

Editorial Notes.

A CORRESPONDENT asks us to furnish him with information, or the name of any treatise, on the "*Discovery of Water.*" We are not sure what our correspondent means by the "discovery of water;" but if he will be a little more explicit, we shall be if possible, to give him the information he wants.

⁂

WE understand that in consequence of the failure of Messrs. Stanes and Co., and the closing of their extensive coffee-curing works at Coimbatore, some of the leading planters about Coonoor contemplate establishing a similar business at Metapollium, and have already secured the necessary land for the purpose.

⁂

THE latest news from the tea districts is that blight is very prevalent in most gardens in the Terai. The manufacturing reports from Assam are generally unfavourable, and indicate a great falling off in quantity as compared with the original estimates, but Cachar and Sylhet are having favourable weather both for growth and manufacture.

⁂

A CASHMERE telegram informs us that the Maharaja has abolished the duties *on all exports. It is unnecessary to say* that this measure was one much needed, and cannot fail in the long run to improve the revenues. But great credit is due to his Highness for the readiness with which he has introduced an important reform so much in opposition to the traditional fiscal policy of the State.

⁂

THE report by Brigadier-General H. C. Wilkinson, C.B., on the Soldiers' Industrial Exhibition, held in Calcutta, during November 1884, has just been published. The exhibition was a successful one as regards the articles shewn by the several soldiers, and the excellence of the work was proved by the ready sale of the articles. The next exhibition, confined to the Bengal Presidency, will be held at Meean Meer during November 1886.

THE indigo brokers report that they have no alteration to make in the estimates already published, although those for the North-West Provinces may yet prove too high. About 250 chests of Oudh native indigo have reached the market, and the quality is said to be fair; 600 more chests have been despatched. A few boiling musters of European indigo have come to hand, but not enough to justify an opinion of the quality of the crop. The season is sure to be a late one, and the first sales will probably be held about the 15th of November.

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WE see that the New York Forestry Commission has been stock-taking, and the results of its labours have been published in a report. It is in pamphlet form, and should prove of interest, for its pages are illustrated with some remarkably fine photographs of the devastation caused in the Adirondacks. There is also a large coloured folding map of this [illegible] prepared by Professor C. S. Sargent, showing the virgin and weeded timber, and the cultivated and barren tracts as they now exist. We would recommend a study of this report to our Indian Forest Officers.

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ACCORDING to the *Dairy World*, a stock company for the manufacture of liquid cheese is preparing to seek incorporation in New York, backed by German capital. The product will look like maple syrup, and have all the pungency and other good qualities of American cheese. We may theretore soon expect to keep our stock of American cheese in the same way as sauce, and use it in a similar manner. The proposal is certainly ingenious, and if carried to a successful issue, will very likely create a revolution in the manufacture of cheese.

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AT a meeting of the American Florists in August last, it was stated by the President, Mr. John Thorpe, that there are at present 2,000 first-class gardeners in the United States, excluding thousands of amateurs. That over 24,000,000 cut roses were sold last year, and something like 125,000,000 carnations; it was calculated that about £40,000 were paid to the Dutch last year for hyacinths and tulips; further, that 700 people are supposed to be engaged in selling florists' supplies, and that there are approximately 2,000 cut-flower sellers. He observed that florists have grown four-fold in ten years, and that catalogues have increased five-fold.

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THE New South Wales revenue returns for the last quarter were £1,670,539, showing an increase of £88,926 over the corresponding quarter last year. Taxation yielded £590,750, an increase of £58,553; customs, £468,69[illegible], an increase of £38,981. The land revenue shows £250,097, a decrease of £48,225. The receipts for services rendered amounted to £775,879, an increase of £85,470. The revenue for the year ending September 30 reached £7,588,804, or an increase of £817,307 over the previous year. Taxation gave £2,249,720, an increase of £167,710. There was an increase on nearly all dutiable articles, spirits being a notable exception, due to the changes in the law having lessened this year's income. The land revenue was £1,959,588, or an increase of £388,844.

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REFERRING to some experiments made in India to test the value of irrigating growing crops, a San Francisco paper says that very "few attempts are ever made in California to cultivate grain by irrigation, it generally being considered too much trouble and expense to justify such a process. It would, however, seem that in dry years, with a corresponding enhanced price for grain, a very fair return might be realized from grain grown by irrigation. In view of the fact that India-grown wheat is already competing in the European markets with that raised in California and other parts of the United States, it would certainly seem worth while to adopt any plan which promises to increase the average yield."

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THE question of "Sugar-refining by electricity," says *Sugar Cane*, is in a fair way of being shortly solved. We learn that the inventor, Professor Friend, sails from New York [illegible] tends giving a demonstration in Liverpool, extending over several consecutive days, refining about five tons per diem, in the presence of witnesses who will see the raw sugar go into, and the refined come out of, the machine. This looks like business. One naturally asks why was not this done in New York? Why was it that the Committee of five gentlemen, of which the president and vice-president of the "Electric Sugar-Refining Company" were members, were not allowed to see the process!

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A RECENT issue of the *Bombay Government Gazette* publishes the opinions of experts on the value of the seed pods of the *babul* tree (*Acacia Arabica*) as a commercial product. It is stated that, tinctorially, the substance is not regarded as of any value, and it is only useful in dyeing on account of the tannic acid which it contains. Comparing the seed pods with tannin in sumach, galls or myrabolams, they contain only a very small percentage of tannic acid. The price of sumach being £16 per ton, these pods would not be worth more than £9 or £10 per ton. It is suggested that the best way to make this product useful would be to extract the tannin from it where it grows, and as probably the bark and even the branches of this acacia may contain more tannin than the seed pods, all could be boiled down together, and a better average yield of tannin obtained.

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OUR esteemed correspondent, Mr. S. Datta, of Mohurbhunj, informs us in a letter which will be found elsewhere, that the proprietors of the Tobacco Farm at Poosa in Behar do not admit apprentices into their concern. This is much to be regretted, as tobacco-growing and curing on improved methods in India is of very recent date; and Messrs. Begg, Dunlop and Co. would be doing a service to the country by admitting and training apprentices upon their farm. We do not, of course, mean that they should undertake to do so without remuneration, but on the same principle as is observed in all the other branches of the trade, *viz.*, on the payment of premiums. Those wishing to article themselves should, we think, be admitted on these terms. We hope Messrs. Begg, Dunlop and Co. will be able to see their way to meeting a want much felt in India.

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THE Ohio State Board of Agriculture for September, 1885, furnishes the following statistics regarding the crops of that State:—Wheat, bushels per acre, 8·2; yield as compared with five previous years, 53 per cent. Total amount of this year's crop 21,707,763 bushels; average crop of five years, 41,005,249 bushels. Oats, area as compared with last year, 118 per cent; yield per acre 35 bushels. Corn, area as compared with last year, 108 per cent: estimated yield per acre, 30 bushels. Probable total yield, 112,192,744; average yield of five years, 97,348,891. From the above it will be seen that, as a set-off against the deficiency of 19½ million bushels of wheat, the State of Ohio has a surplus of 202 million bushels of oats, and nearly 15 million bushels of corn. This will preserve the equilibrium.

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DR. J. E. TAYLOR, Editor of *Science Gossip*, who has recently been exploring in Victorian forests, says that "snakes are gradually getting scarcer in Australia. A war of extermination is being waged against them, which is getting hotter and fiercer every day, for there are more people joining in the attack. The more a country gets cleared for pasturage, the less are the chances for snakes. They are then better seen by their natural enemies, among which, perhaps their most deadly, are the laughing-jackasses (*Dacelo gigantea*)—a kingfisher which has taken to killing and feeding on snakes instead of on fishes." Does it not seem strange that, notwithstanding the large sums annually spent by the Government of India in rewards for the extermination of venomous snakes, there appears to be no diminution in the number of these reptiles? It would be worth while introducing the "laughing-jackass" (*Dacelo gigantea*) into this country.

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ACCORDING to *Forestry*, the High Commissioner of the Island of Cyprus has issued a proclamation calling on the Cypriots to [illegible] for the purpose by the Forest Department are only hereafter to be cut down. Formerly a tree of enormous size was felled to make a trough, using only a hundredth part of the timber; and perhaps the next day another forest monarch, to make a shovel handle. So for every hundred trees which were standing, seventy-two had been felled, and were left rotting on the ground, while there were only twenty-five seedlings for this number of standing trees. To prevent injury from indiscriminate pasturage by goats, reserves are to be absolutely closed for a certain number of years; and when they are opened, other portions of forest will be closed. Resin, formerly extracted in so barbarous a fashion as to cause the death of the tree in seven or eight years, is not to be gathered till the forests have recovered themselves, after which a proper system of extracting resin may be practised.

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From a return which the Italian Government has prepared, in reply to a question asked in the Chamber of Deputies, it appears that there are 4,153,432 owners of land in the kingdom, of whom 2,733,467 are men and 1,399,965 women. Out of this number 682,802 own land alone, and 781,934 buildings only, while 2,668,696 own both land and houses. There are 1,875,238 cultivators of land, while 733,039 are described as independent, and 1,525,155 as following divers professions. The provinces in which the landowners are most numerous are Piedmont, where they number 650,048, out of a population of 3,070,250; Sicily, where there are 510,711, out of a population of 2,927,901; Lombardy, where they are 416,569, out of a population of 3,680,615; the Campagna, where there are 404,670 landowners, out of a population of 2,896,577; Venetia, where there are 341,176 landowners, out of a population of 2,814,173; the Abruzzi, where there are 253,529 landowners, out of a population of 1,317,215; Calabria, where there are 225,545 landowners, out of a population of 1,257,883; Tuscany, where there are 213,679 landowners, out of a population of 2,208,869; Emilia, where there are 183,382 landowners, out of a population of 2,183,391; Sardinia, where there are 163,645 landowners, out of a population of 682,002; Liguria, where there are 137,356 landowners, out of a population of 892,373; and Rome, where there are 120,665 landowners, out of a population of 903,472.

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It is always unpleasant to us to 'pick holes' in the columns of our contemporaries, and it is with much reluctance that we are compelled here to notice a want of journalistic etiquette, in one of our exchanges—and one which we value very much—the *Planters' Gazette and Commercial News.* In the number for October 1st, 1885, there are no less than *five articles* from the *Indian Agriculturist,* reproduced by our contemporary *without any acknowledgment whatever.* Four of those are taken *verbatim,* and the fifth, on the "Utilization of Indian Fibres," has been made to do duty as an original editorial with a preamble of the first four lines. The leading article, headed "The West India Packet", is a re-print of our paper—*verbatim*—on "Sugar Cultivation in India" (without acknowledgment.) We must confess to considerable surprise and disappointment at finding a journal of the standing of the *Planters' Gazette,* stooping to gross plagiarism (we can call it nothing else) of such a glaring character. We are always pleased to see the information contained in our columns quoted and made use of by our various exchanges; but courtesy demands that some acknowledgment should be made in return. We had observed on one or two former occasions some of our articles reproduced in the *Planters' Gazette* without acknowledgment, and our attention was drawn to the fact by a friend; but we attributed the omission to an oversight. We cannot, however, pass over the present instance without a protest against such a deliberate breach of journalistic etiquette.

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Elsewhere will be found an interesting account of the 'balata' industry in British Guiana. Balata is the product of the bullet-tree (*mimusops balata.*) It is manufactured from the milk which exudes from this tree upon the bark being cut; and, when dried, has a chemical composition, (according to Dr. Hugo Natter, F. R. S.) identical with that of gutta-percha and caoutchouc. It may be stated here that the balata-yielding tree belongs to the natural order Sapotaceæ, to which belongs also the *Isonandra Gutta,* known as the Taban-tree, and which furnishes the gutta-percha of commerce. The Shea, or Galam butter of Mungo Park, is the product of another species. The *Achras Sapota,* or Sapodilla plum, of the Calcutta markets, is the fruit of one of the species of this order. We have several representatives of this genus in India, among which may be mentioned the *mimusops elengi,* yielding the "khirnee" fruit of the N.-W. Provinces and the Panjab; and the *Mimusops kanki* or "mowlsari" of the natives, which bear flowers having an overpowering perfume; its fruit, a drupe, is also eaten. The *Mimusops elengi* is very rich in milk, and it would be worth while ascertaining whether it could be utilized in the manufacture of gutta-percha or caoutchouc. The bark of nearly all the species is bitter and febrifugal, and most of them furnish caoutchouc, while others yield fatty matter. The *Bassia butyracea* produces an oily fruit, which furnishes a kind of butter used in Nepaul. In fact, the whole order is remarkable for its varied economic uses. Our contemporary, the *Sugar Cane,* from which we extract the information regarding the balata industry, has mis-spelt the generic name. It should be "*Mimusops*" not "*minnusops.*"

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The following is a summary of the health, crop, and weather reports for the week ending 28th October 1885:—

In Madras the weather continues favourable; rain is again reported from all districts, and the standing crops are generally good. The harvest outturn will, however, be below the average in some districts. More or less rain has fallen throughout the Mysore State, where the prospects of the season are now good. Ploughing for *vysakh* paddy cultivation has commenced. The cattle are in good condition, except in the Malnad District. In Coorg prospects continue favourable. In Bombay there has been slight rain in the Deccan and Southern Mahratta Country, and more is required for the *rabi* crops in parts of Nasik, Khandesh, and the Panch Mahals. The *kharif* harvest and *rabi* sowings are in progress in most districts. In the Central India and Rajpootana States no rain fell in the week under report. In the former agricultural prospects are generally fair, but in Rajpootana the want of rain has seriously injured the standing crops in many places. *Rabi* sowings are in general progress. In the Berars *rabi* sowings continue, but in the Nizam's Territories they have been postponed on account of the rainfall, and fears are entertained of damage to standing crops. In the Central Provinces prospects are now favourable everywhere, and *rabi* sowings are in general progress. Except in the Dehra Ismail Khan District, no rain is reported from the Punjab. The *kharif* crop is being harvested and *rabi* operations are in hand throughout the Province. In the North-Western Provinces and Oudh the weather is seasonable, but some rain is still needed in a few places for crops on highlands. The *kharif* outturn is fairly good, and *rabi* sowings are in active progress. Rain has been general in Bengal, Orissa and Chota Nagpore; but in Behar slight rain has fallen in a few places only. Outside the flooded districts, prospects of *amun* and other standing crops are generally favourable; sowing of *rabi* is in full progress, and the crops already sown are doing well. In Assam the weather is seasonable, and prospects are good. In British Burmah crop prospects are good, except in Prome and Thayetmyo, where more rain is required. The general health is fair in all Provinces. Prices are generally steady, except in Mysore and Bengal, where they are falling.

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In our issue of the 30th May last, page 2[illegible]8, we noticed the rules framed by the Madras Government under *Section 4 (h)* of the Madras *Forest Act (V of 1882)* regarding the exercise of the permission to hunt, shoot, and fish in the Government forests and lands in the Nilgiri District. The *Fort St. George Gazette* of the 23rd October 1885 now publishes a set of rules under Section 21 (h) of the same Act, for regulating the pursuit of game within the limits of any and all reserved forests of any district in the Madras Presidency. The rules run as follows:—

1. Any person who may desire to hunt, shoot or fish within the limits of any or all the reserved forests of any district shall be bound to take out a license at the office of the Collector of the district.

2. The payment to be made for such license shall be Rs. 5, and the said license shall not be transferable. It will be available only for the currency of the calendar year to which it relates, whether it be taken out at the commencement of, or during the currency of, the year.

3. The Collector may, by notification in the District Gazette, declare that any reserved forest shall be closed annually against hunting, shooting or fishing, for any period between the 1st February and the 1st August, and may modify or cancel such notification, and after the publication of such notification no license taken out under Rule 1 will be held to give authority to hunt, shoot or fish in such reserved forest during the close season laid down in such notification. Provided that it shall be at the discretion of the Collector, in the interests of any reserved forests, to declare it closed against a. hunting, shooting, or fishing for the whole of any particular year.

4. The poisoning [illegible] dynamiting of water or the setting of traps or snares for game in any reserved forest is absolutely forbidden. The catching of fish by the damming or baling of water is not prohibited.

N. B.—No elephant may be shot at (except in *bonâ fide* self-defence) by virtue of any license issued by a Collector under these rules. Any person wishing to shoot an elephant, must apply to the Revenue Secretary to Government for permission to do so.

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A SEPARATE set of rules under Rule 21, Section 26, of the Madras Forest Act, V. of 1882, have also been published for regulating the pursuit of game in fuel and fodder reserves, grazing grounds, and areas under special fire protection. They are the same as the foregoing, except for a few verbal alterations, and run as follows :—

1. Any person who may desire to hunt, shoot or fish within the limits of any *land notified as a fuel and fodder reserve, grazing ground or area under special fire protection*, shall be bound to take out a license at the office of the Collector of the district.

2. No payment *will be required* for such license, *but it will* not be transferable. It will be available only for the currency of the calendar year to which it relates, whether it be taken out at the commencement of, or during the currency of the year.

3. The Collector may, by notification in the District Gazette, declare that any *particular fuel and fodder reserve, grazing ground or area under special fire protection* shall be closed annually *or in any year against* hunting, shooting and fishing for any period between the 1st February and the 1st August, and may modify or cancel such notification, and after the publication of such notification no license taken out under Rule 1 will be held to give authority to hunt, shoot, or fish in such *fuel and fodder reserve, grazing ground or area under special fire protection* during the close season laid down in such notification.

4. The poisoning or dynamiting of water or the setting of traps or snares for game in any *fuel and fodder reserve, grazing ground or area under special fire protection* is absolutely forbidden. The catching of fish by the damming or baling of water is not prohibited.

N. B.—No elephant may be shot at (except in *bonâ fide* self-defence) by virtue of any license issued by a Collector under these rules. Any person wishing to shoot an elephant must apply to the Revenue Secretary to Government for permission to do so.

The words italicised show the difference between the two sets of rules. The saving clause at the end of rule 3 in the *first* set, has been omitted in the second set of rules.

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THE latest published Proceedings of the Agri-Horticultural Society of India contain an account of the flowering of the bamboo. The variety of uses to which this most useful plant is put in India China, and Malaya is almost innumerable. Perhaps its chief characteristic is that it runs to seed at long intervals—sometimes of even half-a-century, and that such fructification is only the forerunner of extinction of the parent stock. As the flowering of the bamboo has sometimes happened during periods of scarcity, and as the seeds have thus come to supplement the food-supply of the starvation-stricken population in the affected tracts of country, the event is considered a precursor of drought in the popular mind. The most noted occurrence of this sort is perhaps, the seeding of the bamboo in Malda and other parts of Bengal during the famine of 1874, when bamboo-rice played a prominent part in the dietary of starving thousands. We are informed that the appearance of this grain, which resembles oats in some respects, came like the bounteous interposition of Providence to avert disaster. The people of the favored localities used to flock to the bamboo forests to collect the grain, which was ground and prepared after the manner of wheat for girdle cakes, or otherwise eaten as rice. It will doubtless interest many to learn that this grain is exposed all the year round for sale in some of the bazaars in the hill tracts of the Godavery district of the Madras presidency, where it is treated as a common food product by the indigenous races. This would appear to point to the fact that all the bamboos in that part of the country do not flower at one and the same time. However that may be, we know that the young shoots are used as a vegetable here and elsewhere, and make a pickle highly esteemed by the connoisseur. The medicinal properties of the plant have gained a high reputation wherever it is to be found, the astute Celestial being as great a believer in its virtues as the mild Hindoo.

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NEW uses are being found for the drug cocaine, the active principle of the plant *Erythroxylon coca*, which has attracted so much attention recently in this country. The other day it was reported to have been used most successfully as an anæsthetic, and now the *Lancet* has the following account of its having been used with equal success as a remedy for sea-sickness :—

"In a preliminary report on some observations upon 'cocainum muriaticum' Dr. Manasseiu, of St. Petersburg, gives an interesting account of the employment of the drug in sea-sickness. He had read of its value in uncontrollable vomiting of pregnancy, and thought it might be useful in sea-sickness. He therefore went this summer on a sea voyage, in order to test its efficacy. Among his fellow passengers were two men and a woman, who were especially prone to the malady. He administered to each of them every two or three hours a teaspoonful of the following solutions :—Muriate of cocaine (0·15), rectified spirits of wine (in sufficient quantity), and distilled water (150·0) beginning the administration on starting. That it had a prophylactic effect seems clear, for in spite of very rough weather for a period of forty-eight hours, both the individuals were, for the first time in their lives, free from sickness, and enjoyed a very good appetite the whole time. To a child six years old, who began to be attacked with sea-sickness on rising in the morning, the treatment was so effectual that it was able to play about during the day, in spite of the storm. The child took one teaspoonful in two doses during the first half-hour, and then half-a-teaspoonful every three hours. Another case was that of a girl eighteen years of age, who had been sick for twenty-four hours before the drug was given. The case being a severe one, she had a double dose every half-hour, with 'truly magical effect,' for after the second dose the patient was able to assume a half-sitting posture, and after the sixth dose she jested, and began to complain of hunger. During the rest of the voyage she remained well, although there was much rolling of the vessel. Similar good results attended the use of the drug in three milder cases; and had it not been that his supply ran short, Dr. Manasseiu would have been able to make more extended observations. Still, from the experience of these few cases, he thinks it justifiable to infer that in the drug we have a certain and harmless remedy against sea-sickness. In the same communication he mentions that he had found 'cocainum muriaticum' of great service in arresting the collapse of two severe cases of simple cholera, and thinks it desirable to try its action in cases of Asiatic cholera."

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DR. T. CHRISTY, writing in the *Gardener's Chronicle*, on the subject of cocaine, says :—"The *Sethia indica*, having been sent to me under the name of *Erythroxylon monogynum*, is found upon examination to contain a certain amount of alkaloid. The *Sethia accuminata*, which has also been sent to me as a variety of erythroxylon, is a drug that has long been in use in Ceylon as a vermifuge, and I have for some time distributed it in the form of a fluid extract. At that time I was not aware that it had passed under the name of erythroxylon. As soon as further supplies of these two drugs arrive, a therapeutic examination will be carefully made with the alkaloids. I am glad to be able to record some further valuable information of general interest respecting erythroxylon coca."

He here quotes the testimomy of Dr. Manasseiu as to its employment in sea-sickness, quoted above, and goes on to say :—

Dr. G. H. A. Dabbs reports this week in the *British Medical Journal* (p. 473) that he has used cocaine most successfully in four consecutive cases of childbirth, and that it is his intention to to use it in future cases.

I can only add that in one American journal that reached me last week, there were twelve notices of the employment of cocaine, and in no one instance have I as yet been able to trace any ill-effects from its use.

The employment of the *Erythroxylon Coca* has now gone from the barbaric stage of depending for the effect by chewing the leaves (which might be fresh or stale: this means „that they might contain hardly any percentage of cocaine, or, on the other hand, they might contain 0·55 per cent), to the employment of the alkaloid where the doses can be most accurately apportioned. The solution of hydrochlorate of cocaine with water is always better when made fresh, and it is safe to apply it in any case of pain, even with children, by rubbing it in. It is most easily mixed with vaseline, and rapidly allays pain in the joints. A small quantity of the alkaloid may be put with water and then placed on sugar, and it has a marked effect upon any one suffering with a sore throat. The price having fallen to about 4*d*. per grain, it is quite within the reach of any one.

It would thus seem that there is no limit to the uses of this extraordinary drug.

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The result of the measures adopted for the extermination of wild animals and poisonous snakes in British India during the year 1884, shows that the number of human lives lost decreased slightly, *viz.*, from 22,905 in the previous year to 22,425; and that this decrease was common to all provinces except Bengal, British Burmah, and Coorg. As usual, by far the greatest number of deaths were due to snake-bite, the figures being 19,629, compared with 2,795 deaths by wild animals. The lower provinces of Bengal and the N.-W. Provinces and Oudh account for 75 per cent of the total mortality. Tigers caused 831 deaths, wolves 265, leopards 229, and "other animals" 1,266. Under the last head, jackals caused 547 deaths in Bengal alone, and 70 in the N.-W. Provinces and Oudh. Alligators, sharks, and crocodiles were responsible for 123 deaths in Bengal. It seems scarcely credible that an apparently harmless animal like the jackal should prove so destructive to human life, but the victims must chiefly have been very young children. The loss of cattle amounted to 49,672, against 47,478 in the previous year. In their case the largest number was destroyed by wild animals, *viz.*, 47,944, and only 1,728 by snakes. Bengal suffered the greatest loss, *viz.*, 12,397. Tigers and leopards were equally destructive, having killed 19,680 and 19,699 head of cattle, respectively. The number of wild animals destroyed shows an appreciable increase, *i.e.*, from 19,890 in the previous year to 23,775. Professional *shikaris* in Bengal accounted for 495 tigers alone. There is a marked falling off in the number of poisonous snakes destroyed, *viz.*, from 417,782 in the previous year to 380,981, but whether we may infer from this a corresponding diminution of the species is perhaps doubtful. The total amount given in rewards increased from Rs. 1,74,355 in the previous year to Rs. 2,46,525. An important point referred to by the Government of India in their resolution on the destruction of wild animals, is the issue of licenses for the possession of arms for the destruction of wild beasts and the protection of crops. It is said that "licenses should be freely given when necessary" for these purposes, and local Governments are requested to report full particulars as to the number of licenses issued. We notice that in Bombay, 1,418 such licenses were issued during 1884, while in Assam the figures reached 6,791. Hyderabad returns show 4,492 licenses issued. The system of paying rewards for the destruction of venomous snakes does not appear to have been adopted generally. It was introduced into the districts of Mozufferpore, Durbhunga, and Monghyr in 1882, and has worked satisfactorily, the number of snakes destroyed in these districts having increased from 10,534 in the previous year to 16,039. In the Madras Presidency, the entries under this head are blank, and the attention of the local Government is drawn to the subject. It appears to us very desirable to introduce the system throughout the country. As a rule, religious scruples forbid the destruction of snakes by Hindoos; but the prospect of a reward may have the effect of calming such scruples to a certain extent. With regard to the subject generally of the destruction of wild beasts and venomous snakes, the Governor-General in Council very rightly observes that much depends on the degree of personal interest taken in the matter by district officers; and instances are not wanting to show that increased exertions on the part of district magistrates are quickly followed by largely increased destruction. As an example of this, the arrangements made by Mr. KENNEDY, the District Magistrate of Gorukhpore in the North-West Provinces, are quoted, where, by the prompt payment of rewards, the number of snakes destroyed during the year under review at once rose from 203 to 4,418. This is certainly a very striking instance of what 'personal interest' can do in this direction, and the example of Mr. KENNEDY might well be imitated in other districts with nothing but advantage. Without personal exertion of this sort, there can be little hope of materially lessening the loss of human life by snake-bite and wild animals, and increasing the number of reptiles and wild animals destroyed annually.

GOLD ORE-EXTRACTING PROCESSES.

GOLD-MINING forms an important industry in Southern India, where various Companies have from time to time launched into the business with fluctuating success. Large capitals have been sunk in the attempt to extract the precious metal under various methods having for their object the least amount of expense with the greatest amount of yield. There have been many failures, and but few successes, and these of a negative character. At the present time some mines are being worked at a positive loss, while others can hardly be said to be working with any profit to speak of. We have noticed from time to time the numerous discoveries said to have been made by which the extraction of the gold from the quartz, and the other mineral substances in which it abounds, would be rendered quite an easy matter. But so far as we are aware, most, if not all, of these so-called discoveries have been confined to the domain of speculation. There seems, however, to be a chance of something definite being established as to an improved process for extracting the ore with advantage to the miner. Mr. Bosworth-Smith, the Government Mineralogist, Madras—who has since his arrival from England been endeavouring to ascertain the mineral resources of the Southern Presidency—has been making an enquiry into the process adopted for extracting the metal at the Illith*orai gold mine*. This *is* one of the few gold mines which is being worked with anything like satisfactory results. Mr. Bosworth-Smith has submitted the following report, dated 15th September 1885, to the Government of Madras on an improved ore-extracting process, which *primâ facie* holds out a hope that gold-mining may be carried on with profit, and should prove cheering news to shareholders in Southern India mines:—

"Since writing my report upon the Illithorai gold mine, in which I stated that, in my opinion, the process there contemplated was not likely to succeed, I have received an account of a new process, which, in my opinion, would be far superior to the one I then recommended. The method that I suggested was that devised by Platner and is termed the 'Chlorinization process;' but since then Mr. H. R. Cassel, who has works in Verulam-street, Gray's Inn-road, London, has invented a process which is said to be able to act upon refractory ores even better than Platner's process. Mr. Cassell also uses chlorine to dissolve the gold, but this gas is generated in a different way. In the 'Platner process' hydrochloric acid acting upon black oxide of manganese (manganese dioxide) generates the chlorine, the manganese being afterwards recovered from the manganic chloride by 'Weldon's process.' In the 'Cassel process' the chlorine is generated from common salt (sodium chloride), by means of an electric current—the same electric current also depositing the gold as a metallic mud in another part of the apparatus, which seems to resemble a Brookner's cylinder. Thus the anode generates the chlorine whilst the cathode precipitates the metal. The following is an account of the process as performed experimentally before number of the leading metallurgists in London:—

'The gold ore, having been pulverized, and concentrated, is placed in a revolving drum with a quantity of salt water, the drum being of sufficient capacity to hold a charge of about 2½ tons. Inside the drum is a series of carbon electrodes, through which is passed an electric current generated by an ordinary dynamo-machine. Soon after the drum is started, caustic lime is added, in order to neutralize by secondary action the acids which would otherwise be formed and would attack the iron, arsenic, or other metals that might be present in the ore, forming salts of these metals which would precipitate the gold were their formation not prevented, thus undoing all the previous work. By the electrolytical action the salt is decomposed, and chlorine in a nascent state, as well as oxygen, is given off at the carbon anodes. The chlorine combines with the gold, and forms with it a solution of chloride of gold. From that solution the electrolytical action carries it into the interior of a pipe which is covered with asbestos cloth, and placed horizontally in a revolving drum, the gold being deposited in a finely-divided metallic state on the interior surface of the pipe which forms the cathode. Inside this pipe is an Archimedean screw, which keeps the water in circulation, carrying the gold slime into a receiver in which it is deposited by gravitation. The slime is drawn off from the receiver at intervals and dried, the gold being recovered by smelting in the usual way. The main object in having a revolving drum is that, owing to its rotations the ores inside it may be constantly thrown up against the positive electrodes, where the nascent chlorine is generated, and thus become converted into chloride of gold.'

Thus it will be seen that the "Cassel process" compares favorably with the Platner in the following respects :—

1st. It is adapted to more refractory ores.

2nd. No previous roasting of the ore is required.

3rd. The chemicals required for the solution of the precious metal are usually at hand, being common salt and ordinary lime.

4th. No chemicals are required for the precipitation of the gold from auric chloride.

In my report I stated that the chief points for consideration, before using at Illithorai the Platner or chlorinization process as I there called it, were (1) the price and nature of fuel, and (2) the price of chemicals. If the "Cassel process" were used, the nature of these considerations would be considerably changed, as (1) no fuel would be required, and (2) acids are not necessary, neither are expensive chemicals required. Lime could be brought up from Coimbatore where limestone is abundant (burnt 'kunker' should not be used for this process) and salt should be easily obtained. I would suggest that the Illithorai and Kartary Mining Company should send a sample of ore to Mr. Cassel and allow him to try his process experimentally first; then, if successful, put up at Illithorai a suitable turbine powerful enough to drive the necessary stamps and a dynamo-machine for producing the electric current. If the company have such experiments made, they will learn with a very small outlay whether the reef is worth working at all, for, if this process failed, it is exceedingly unlikely that any other could pay."

The suggestions made by Mr. Smith for testing the value and utility of the process recommended by him, are worthy of consideration and trial, and we commend them to the notice of gold-mining companies. The merit of Mr. Bosworth-Smith's communication lies in the fact that he is a trained and professional mineralogist; and being a Government official carrying out a series of investigations with a view to ascertain, and develop, if possible, the mineral resources of the Southern Presidency, he would not be actuated by any private interests or motives in bringing to notice any particular process of extraction without being satisfied himself of its utility or superiority over others.

THE ENSILAGE COMMISSION.

We have watched very closely the course of events in regard to the enquiry into the value or otherwise of the system of ensilage. We have consistently maintained that the system would prove of inestimable value to this country, and we have expressed certain decided opinions upon the subject. We have, however, been looking forward with much interest to the report of the Royal Ensilage Commission, which is calculated to set at rest the question whether, as a method for storing fodder, and as a food for stock, it is worth any one's while to resort to the system in preference to hay-making, which is dependent upon climatic influences, more or less. We are now in a position to furnish our readers with the following preliminary report of the Ensilage Commission, which may be accepted as embodying the views of the Committee in a general sense. We direct special attention to the portions we have italicised, as bearing out our own views as to the superiority of silage over green fodder as a milk-producer :—

The Commissioners have, up to the present time, held 11 sittings and examined 38 witnesses, comprising among their number owners and occupiers of landed estates and their agents, tenant-farmers, designers and inventors of different forms of silos, or of different systems of applying the necessary weights to stacked or ensiled green fodder, chemists, and authors of pamphlets on the general subject. They have also had the advantage of hearing the views of Sir John Bennet Lawes, whose eminent knowledge of all matters relating to to the chemistry of agriculture, combined with the fact that his published opinions on the process of ensilage have been regarded as unfavourable to the system, has rendered his evidence of great value and interest.

The Commissioners have by no means desired to exclude unfavourable evidence; on the contrary, they have endeavoured to induce some of those who were believed to be opposed to the system to give them the benefit of their opinions, but they have so far heard no expression of any decidedly unfavourable views. The the evidence tendered has been entirely voluntary, all witnesses attending at their own expense.

The evidence of all those who have practically tested the various methods of converting green fodder crops into preserved food for animals without putting them through any process of drying, such as is necessary in the making of hay, has, without exception, established their claims to a considerable amount of success; and although in some cases the results have been evidently more satisfactory than in others, the advantages which the different operators, one and all, have claimed for their systems seems to show that a nourishing and useful food for animals can be preserved, independently of any drying process, within wide lines of divergence in the details of the methods adopted.

It has been conclusively shown that, by different degrees of weighting and of expulsion and exclusion of atmospheric air from the material stacked or ensiled, different degrees of heat and of consequent chemical change are produced.

The degree to which such chemical changes increase or diminish the feeding value of the silage itself, or its relative value in comparison to the green crop, is, in the present state of knowledge, in great measure a matter of opinion, and careful feeding experiments, conducted with a view to test the exact effect of these changes, will be highly important to a solution of this question.

Silage which has been covered in immediately after cutting, and not again uncovered, has been shown to retain its colour and freshness, although developing small quantities of certain acids indicative of a process of fermentation without any considerable accession of heat. Other silage which has been put in at intervals, and from which the air has not been immediately or entirely excluded, has undoubtedly developed considerable heat, and in this case the colouring matter of the leaves has been less well preserved. Yet in both cases, a useful feeding material has been rendered available, which, in unfavourable weather, would have been practically lost if any attempt had been made to convert it into hay.

Bearing in mind the importance of economy, the Commissioners have inquired into the efficiency of various systems of stacking unchaffed green fodder crops without drying, by which it has been contended that, with a proper system of pressure, the necessity for a silo can be done away with.

The Commissioners are not at present prepared to express any opinion upon the economy of any such system, or to compare its advantages with those which are claimed by the advocates of chaffed and close stored silage; but it seems to be established that a temperature sufficiently high to involve danger of fire can be controlled by a proper and efficient system of applying weight in the stack of green fodder.

The different systems of applying weight have greatly occupied the attention of the Commissioners, but as the quality of the silage does not appear to be materially affected by this question, it becomes simply one of economy, and may safely, for the present, be left to each operator to decide for himself according to the special circumstances affecting the particular locality in which his farm is situated.

Some of the best samples of chaffed silage have been produced with pressure not exceeding 70 lbs. per superficial foot, but the degree to which weighing is necessary or desirable remains to be decided upon the greatest amount of evidence that may become available to us. Good results are claimed to have been obtained by means of weights varying from 7 lbs. to 300 lbs. per superficial foot on the top of the silage.

The experience of dairy farmers does not appear to justify the assertion which has been more or less circulated that dairy produce is in any way injuriously affected by silage as food; on the contrary, much valuable evidence has been received to show that feeding *with well-made silage distinctly improves the yield of milk and cream, and the quality of butter.*

Where complaints have arisen of milk becoming tainted, the cause has been in our opinion, traceable to its having been in proximity with strong smelling silage, or with persons who have handled it, rather than to the use of such material as food.

The Commissioners have already heard sufficient evidence to justify them in encouraging the development of the system of storing undried green fodder crops as a valuable auxiliary to farm practice. In addition to other advantages, losses, occurring through weather unfavourable for haymaking, may be avoided, and some crops not hitherto grown in this country on account of the impossibility of ripening their seed (such as certain varieties of maize), may probably be successfully cultivated in certain districts to the increase of our present means of feeding various kinds of live stock on arable or partly arable farms.

(Signed) Walsingham (chairman), H. A. Brassey, A. M. Cardwell, Drogheda, N. Eckersley, Egerton, of Tatton, J. S. Gathorne-Hardy, Wm. J. Harris, Nigel Kingscote, Mitchell Henry, James Howard, H. Kains-Jackson, Faunce de Laune, J. C. Lawrence, Peter M'Lagan, Fredk. Marshall, Henry Robinson, Stanhope Tollemache, and Jacob Wilson.

RUSSIAN TRADE IN TURKESTAN.

The state of affairs on the North-West Frontier has happily another aspect than that which has engrossed attention in India for some time past. The Russian approach to India from Central Asia has hitherto been mainly looked at from a purely military point of view; hence an endless variety of hostile schemes have been attributed to our northern neighbours, all having as their object the invasion of India. Now, however, that Russia actually touches the boundaries of Afghanistan, another, far more interesting and important question has been brought forward for consideration,—that of the probability of a successful opening out of trade between Russia and, India through the medium of Afghanistan. Those who have for years past, looked upon Russia as a natural enemy to English rule in India, will probably regard with suspicion any attempt that may be made in this direction, especially if the initiative be taken by Russian merchants. But others, putting aside the groundless fears that have for so long held possession of many minds, will welcome the possibility of the opening out of trade on our northern and western frontiers, even though Russian merchants be engaged therein. Russia has so much room for the extension of her commerce with Central Asia alone, that for this and for other reasons, her trade with India is not likely to occupy much attention, so far as she is concerned, for many years to come. If, however, the Russian Government could be induced to consent to perfect freedom of trade with India, no time would be lost—on this side of Afghanistan—in setting in motion what might prove a very large and lucrative trade. But Russia must unfortunately protect her manufacturers, and in this way questions of duties will arise, the settlement of which, on the basis of free trade, may be difficult to arrange. But the earnestness and eagerness with which the Russian merchants of Baku, Orenburg, and various other places, are setting to work to secure the advantages to be obtained from trading with all parts of Central Asia, indicate early that the formation of trade routes, roads safe from attack by robbers, and the establishing of regular trading operations throughout Central Asia, must eventually lead to extending these routes to India, with results hitherto disregarded, because not perceived, from the narrow and mischievously limited considerations usually given to the current of events in Central Asia. Merv, Sarakhs, and Herat are places that are associated at present in most minds, either with war, or as centres of intrigue, difficulties, and dangers innumerable. The two first-named places are, in the imagination of the many, mere pivots on which the destinies of English prestige in the East must some day turn, from their capture by Russia. Now that both these places are in the hands of Russia, the sun still runs his daily course: no sign of the predicted storms is to be seen; but we hear the voice of merchants asking for facilities for trading. They want roads for their merchandise, and do not anticipate war, or even tumult. The military ardour of Russian officers in Central Asia will probably be no more difficult to restrain than the warlike spirit that finds utterance in India amongst English officers and with the bureaucracy, so rarely capable of independent thought. The long period of unrestrained exercise o power that Russian Generals have enjoyed in Central Asia, may render them impatient of the limit of Russian advance now reached; but the necessities of the Russian Government, the cost of continuous military movements in Central Asia, and the prospect of putting an end to them for some time to come, will force the Government to stop effectually the aggressive propensities which its Generals and officers indulge in common with our own. The commercial aspect of affairs in Central Asia does not exclude political considerations, nor will it render English statesmen indifferent to the protection of the frontiers of our Indian Empire; but it should prevent us from looking at the altered condition of the people in Central Asia, now that they have come under a rule that establishes some sort of order, as being on that account filled with danger to the peace so long enjoyed in our own possessions in India. It would indeed be surprising if the introduction of good government into Central Asia, should be the signal for war and bloodshed in India. These anticipated disasters are the pure offspring of the fears of our own countrymen in India, or at home, and certainly do not emanate from the Russian Government. There is, so far as we can see, no sufficient reason why the present juncture of affairs on our northern frontier should be productive of aught else but an extension of trade and the promotion of peace and good-will.

A Russian official paper, the *Journal of the Finance Minister*, publishes an important article on the trade of Russian Turkestan. The present administration of the Governor-General of Turkestan is confined to the districts of Sir Daria, Ferghana, Zerafshan, and Amu Daria, which have a total area of 611,000 versts, and a population of 2,335,000 souls. The territory is divided as follows :—

	Extent in square versts.	Settled population.	Nomad population.	Total population.
Sir Daria	416,750	500,000	654,000	1,154,000
Ferghana	85,000	540,000	150,000	690,000
Zerafshan	23,250	360,000	....	360,000
Amu Daria	86,000	50,000	101,000	151,000
Total ..	611,000	1,430,000	905,000	2,335,000

Throughout this vast region, the character of the soil, as might be expected, varies considerably, and presents striking contrasts. To the north it is of a sandy nature, and imperfectly watered; but towards the southward and eastward, there is fertile soil, well watered, and with a rich vegetation of grass and trees. Since the annexation of Turkestan by Russia, the proportion of the nomad population is said to have greatly decreased, and where it was before two-thirds of the tota population, it is now less than half. Some interesting information is given regarding the various races who now constitute the settled population, which may broadly be divided into three classes—Iranian, Mongol, and Turk. In the towns may also be found Hindoos, Persians, Arabs, and Jews. The system of agriculture has special features peculiar to Oriental countries, and the same may be said of the manufactures. Small properties, producing a little of everything, are common to the former, and among the latter no manufacturer confines himself to the production of any one article on a large scale. The chief cereals under cultivation are wheat and rice, but barley, millet, and other grains are also grown. The grain-producing capacity of the country is indeed very great. The statistics give the following as the annual production of the lands under cultivation— wheat, 17,000,000 pouds;* rice, 10,000,000 pouds; djougara 8,800,000 pouds; millet, 5,400,000 pouds; barley, 3,100,000 pouds; other cereals, 3,000,00 ponds,—total, 47,900,000 pouds The cultivation of cotton in Russian Turkestan is also a growing and important industry, and already the annual production reaches 550,000 poude. The cultivation of American cotton has been commenced, but the result is not stated. Horticulture is profitably carried on, and the dried fruits are sent into Siberia and the south of Russia. Vine culture is said to be steadily increasing, but the produce does not yet suffice for more than local consumption. Another important industry is sericulture, which is largely carried on. The annual silk production is as follows :—

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* The poud or pood=36lbs. English.

	Pouds.
Ferghana	15,000
Zerafshan	10,000
Khodjent	3,000
Chimkent	2,000
Total ...	30,000

Other Central Asian countries also contribute to the silk industry largely. The following statistics are given :—

	Pouds.
Bokhara	60,000
Khiva	3,000
Kashgar	10,000
Total ...	73,000

This culture brings in an annual revenue of about 13 million roubles. Other industries which also give good returns are fishing, chiefly engaged in by the Russians at the mouth of the Sir Daria and in the Aral Sea, trading in skins, cattle-raising (the exclusive occupation of the nomads), and the raising of oil. As an example of the immense impetus given to the various industries of these regions since the annexation of the khanates by Russia, the following tables showing the number of workshops in existence, will prove of interest:—

	Workshops.	Workmen.	Annual production in roubles.
Sir Daria ...	720	3,000	1,400,000
Ferghana ...	420	2,000	800,000
Zerafshan ...	520	1,000	600,000
Amu Daria ...	2	50	50,000
Total ...	1,662	6,050	2,850,000

When it is remembered that, previous to the Russian annexation, everything was produced by hand labour alone, the result is encouraging, and seems to hold out a hope of future prosperity. The principal factories and workshops, to the number of 40, are, it is stated, owned by Russians, and they include 12 spirit distilleries, 5 tobacco factories, and 7 leather manufactories. The numerous small native workshops are chiefly engaged in the making of thread and silk, and the work-shops of Ferghana alone are said to produce more than 1,000,000 roubles worth of silk, and about 300,000 roubles worth of cotton goods. It has been found impossible to compute the production of tissues in other localities, but it is said to be extremely active in every family. Within the last 20 years the commerce of Turkestan is believed to have doubled, and according to the returns the external trade now stands as follows :—

EXPORTS.

	Roubles.
To the Fair of Nijni Novgorod ...	6,000,000
To the Fair of Irbit	500,000
To the Fair of Krestovsky ...	500,000
To the Fair of the Steppe	1,000,000
To Orenburg and Orsk	1,300,000
To Troitzky	1,000,000
To Petropaulovsk	500,000
To Semipalatinsk	1,000,000
Total ...	10,800,000

IMPORTS.

	Roubles.
From Orenburg and Orsk	5,500,000
From Troitzky	2,000,000
From Petropaulovsk	1,500,000
From Fairs of the Steppe	2,000,000
From Semipalatinsk and Semiretchinsk	1,000,000
Total ...	12,000,000

European Russia supplies Turkestan with all she requires in the shape of cotton manufactures, linen, and fancy articles, and she receives in return cattle, and also Indian tea, to the value of about 1,000,000 roubles. Turkestan also has a valuable export trade with Khiva, Bokhara, and Chinese Kashgaria, which amounted in 1884 to 6,000,000 roubles. Wise men, instead of forecasting nothing but war and conflict between these distant but industrious people and those of India, will look forward to a time when, in spite of every hindrance, there shall have arisen a vast, constant, and profitable interchange of commerce with them by the great developing power of the railway system.

Miscellaneous Items.

THE Indian salt revenue for the first six months of the current financial year amounted to Rs 2,94,24,000 on 15,109,000 maunds, as compared with Rs. 2,82,01,000 on 14,746,000 maunds during the corresponding period of last year.

WE understand that cattle, both in Singapore and in Malacca, have lately been attacked by various forms of disease, and many cattle-owners have suffered serious losses. The presence of a trained Veterinary Surgeon in every district would be an incalculable blessing.

THE assay value of coins and bullion received in the Indian mints in the first six months of the current financial year was Rs. 6,00,16,130. and of that coined and examined Rs. 6,11,22,014 Of the latter the Calcutta Mint did Rs. 2,21,79,192, and the Bombay Mint Rs. 3,89,42,822.

THE value of gold imported during the first six months of the current financial year was Rs. 1,86,69,541, and of that exported Rs. 14 91,645; whilst the value of silver imported was Rs. 6,74,74,945, and of that exported Rs. 31,45 221. This leaves a balance of both metals in favour of imports of Rs. 8,15,07,620.

THE trade of the Punjab continues to flourish, and within the last two years the exports have more than doubled in weight and have nearly doubled in value. The chief feature in the most recent report is the wonderful expansion in the export of oilseeds, which has risen from less than a million of maunds in 1882-83 to nearly 5½ million in 1884-85. The value of this export was over 175 lakhs of rupees, or rather more than a quarter of the whole export trade of the province.

AT a recent meeting of the South Australian Corn Trade Association, reference was made to the receipt of a communication from England respecting the short outturn of wheat cargoes from California and Victoria. In the interests of the colony, it was suggested that communications be opened with the Victorian Corn Trade Association. The Chamber of Commerce is to take action to remove any cause of complaint. It was asserted that the late rain had improved the prospects of the wheat harvest in the colony.

A CORRESPONDENT of the *Statesman*, writing from Ghazipore, under date, October 23, says :—The paddy crop is very satisfactory and all that can be desired. Aged people say that they have not seen such a splendid outturn for the last seventy years. At first, vague fears were entertained as to considerable damage to the paddy crop, on account of the late heavy and unusual rains. They have, however, done good, and improved the condition of the crop. Cabbages, turnips, potatoes, wheat, barley, peas, and various other seeds have just been sown. The soil has turned very soft and rich owing to the late *hattia* rain.

A CONTEMPORARY says :—In a recent Resolution of the Finance Department on the subject of the expenditure on Government stores in India and in England, occurred a statement which seems to require a word of explanation. While a large saving was shown by the substitution of Indian brewed beer for imported in Bengal, it was added, "In the return for Madras, however, a loss amounting to Rs. 4,845 is exhibited out of a transaction of Rs. 1,03,282." To people who know of the skill and enterprise with which brewing has been carried on of late years in the Nilgiris, this statement must have read strangely. And, as a matter of fact, it is directly misleading. An examination of the detailed military store expenditure shows that the loss, or most of it, was incurred in the purchase of European beer in the local market—the most expensive of all methods, for which the only excuse is an actual running short of supplies. From the same source it appears that the Madras Government really made a saving of Rs. 43,968 by the purchase of Indian beer in a transaction of a little over a lakh. The Nilgiri beer cost them Rs. 1,03,282, and the same quantity obtained through the Secretary of State would have amounted to Rs. 1,47,250. Looking at these remarkable figures it is satisfactory to know that already rather more country beer is drunk by the British troops in India than English; and as the Madras Government has concluded a long-term contract for the full supply of the troops in that Presidency, there will be less chance of such mistakes in the future.

THE Government have, rather against the public expectation, declared themselves against Mr. Smith's proposal for the holding of a Jubilee Exhibition in 1887 at Adelaide. Mr. Smith's motion is in favour of the Government granting £32,000 for the buildings, upon the understanding that private persons will guarantee all other expenses. The Ministry state that the public finances will not justify the proposed grant, ignoring the fact that the exhibition would indirectly largely increase the revenue. A large meeting in the city has pronounced in favour of the scheme; some gatherings in the country have condemned it. In connection with the question of exhibitions, it may be mentioned that Sir Samuel Davenport has agreed to represent the colony as one of the Commission in London for the exhibition next year. His decision has given the most genuine satisfaction.

Selections.

OFFICIAL PAPER.

[SUMMARY OF THE WEATHER FOR SEPTEMBER 188 .]

THE chief features in the meteorology of the past month have been the practical cessation of the rains over the greater part of North-Western India, and the passage of a small but severe cyclone from the Bay across the Orissa coast and thence into Behar. Both branches of the monsoon have been more or less unsteady, and the rainfall has been chiefly determined by subsidiary depressions, occasioning thunder-storms with heavy local rain, and (in Bengal) by the larger disturbance noticed above.

Beyond a few showers, no rain of importance fell in the Punjab or the adjacent parts of the North-Western Provinces, either on the hills or plains, after the 7th; and in the Berars, Central India, and Rajpootana, except a few showers, generally of small amount, during the third week, there was scarcely any rain throughout. Similar conditions prevailed in Khandesh. Malegaon and Dhulia had only slight and occasional showers and the rainfall was very deficient. In the Indus Valley not a drop of rain fell throughout the month.

From the 1st to the 5th there was fairly general, and in places heavy, rain over Bengal and for some distance up the Gangetic plain, and slight rain in the Peninsula. On the 6th and 7th, rain was restricted to Bengal and a few places in the Central Provinces and the Peninsula. On the 8th heavy showers occurred in the South Carnatic, but on the 9th and the three following days, little rain of importance fell in any part of the country. On the 13th showers recurred over the Peninsula, and from that date until the 18th they were fairly general throughout Southern India, Bengal, and Assam. On the 19th and 20th there was no rain of importance throughout the whole of India, and on the latter day a serious cyclonic depression began to form off the Orissa and Ganjam coasts. This cyclone passed over the land probably at about 7 or 8 A.M. on the 22nd. It occasioned heavy rain in its immediate neighbourhood and slight rain over the whole of India, except the North-West; but the heaviest precipitation connected with this disturbance occurred during the 23rd and 24th, when the storm had reached Behar and was breaking up. After the dispersion of this storm, a few showers occurred in different parts of the country: but these became less general, and the only rainfall reported, during the last few days, was from a few places in the Peninsula.

The table of the month's rainfall shows that it was deficient throughout the whole of the Punjab, the North-Western Provinces, the Central Provinces, the Peninsula (with the exception of the Deccan, Hyderabad, Mysore, and Bellary), the Eastern Peninsula, and Ceylon, while it was in excess over the whole of Bengal, from Behar to Orissa, and in Assam and Cachar. As compared with previous months, there is a great improvement in Mysore, Bellary, and the Deccan, but in some other parts of the country the rainfall has been very deficient.

The total rainfall of the season is very deficient in the Indus Valley—particularly at Peshawar,—slightly in the north of the Punjab and at Sirsa; also from Khandwa westward in Central India and Khandesh, and southward in the Bombay, Deccan, and North Mysore. Elsewhere the rainfall of the four months has been up to, or has exceeded, the average.

The Cyclone.—The information respecting this cyclone, which was the most severe storm of the present year, is at present very scanty and, owing to the unfortunate disaster at False Point, all particulars from that most important station are wanting. From newspaper reports it appears that in about longitude 87° 30′ E. and latitude 23° 0′ N., the barometer read early on the morning of the 22nd as low as 28·20 inches; but the report received from Cuttack, which, after False Point, was the station most directly in the path of the storm, reports no lower reading than 29 28 inches. The first indication of the formation of the cyclone was given by Diamond Island, which on the 20th reported a south-east wind and a very rough sea; but it was not till the morning of the 21st, when the wind backed to north east on the Orissa and Ganjam coasts and the barometer began to fall at False Point, Saugor Island, and Gopalpore, that there was any direct evidence of the formation of a cyclone. After 10 A.M. on the 21st, however, the storm must have advanced and developed with great rapidity, as by 10 A.M. on the following morning the centre was at Cuttack, where the barometer had fallen half an inch. The following telegram was despatched from Cuttack at 7 P.M., 22nd: "Cyclone began 1 A.M., reaching greatest velocity at 9; a break at 14 30. Wind still blowing with greatest violence." After leaving Cuttack the storm rapidly decreased in intensity, and travelled quickly north-westward. The centre lay between Gya and Benares on the 23rd, and was almost indistinguishable on the 24th. As the intensity of the storm decreased, the rainfall appeared to increase. Before reaching Behar, the surrounding precipitation, though heavy, had not been exceptional, but on the 23rd and 24th, the following amounts were reported from Northern Bengal:

	Inches.		Inches.
Darjeeling ...	13	Goruckpore... ...	8½
Purneah	9	Dinagepore ..	6
Patna	4½		

With the exception of a few places in the Peninsula pressure was everywhere above the average of the month. This excess was greatest (between 0 05 inch and 0 08 inch) within a band which ran east and east-north-east from Guzerat across Central India, the south of the North-Western Provinces, and the Central Provinces to the Orissa Coast. On either side of this band the amount of the anomaly decreased, diminishing to + ·017 at Peshawar and to —·051 inch at Mangalore. The differences of temperature from the average in Northern India were somewhat irregular; but on the whole, September was a cool month, particularly in Bengal. In the central parts of the country, in the Peninsula, and also in Burmah, on the contrary, temperature was in excess. Humidity was below the average almost everywhere, the principal exceptions being North and East Bengal and a few places in Madras.

The following table shows the amount of rain and the difference from the average during the month of September according to districts, as far as is indicated by the telegraphic reports:—

DISTRICTS.	Average rainfall in September.	Difference from the average in September 1885.
Punjab, West	2·54	—0 88
Punjab, East	4 26	—3·02
North-Western Provinces, trans Gangetic ...	7·46	—2·39
North-Western Provinces, cis-Gangetic ...	6·10	—4·75
Behar	7·35	+7·90
Northern Bengal	14·46	+8·44
Assam, Cachar	11·18	+4·84
Lower Bengal, Chota Nagpore	10 33	+0·76
Orissa, Northern Circars...	7·94	+0·10
Central Provinces, South	9·66	—7 01
Berar, Khandesh	5·41	—2·27
Rajpootana, Central India, Saugor, and Nerbudda	6 33	—5·35
Sind, Cutch	1·16	—1·16
Guzerat	5·12	—4·26
Konkan	10·37	—0 75
Deccan, Hyderabad	5·51	+2 30
Malabar	10·93	—4·85
Mysore, Bellary	4·56	+3·19
Karnatic	3 63	—0 60
British Burmah	18·97	—6 84
Ceylon	4·77	—2 49

W. L. DALLAS,
Asst. Meteorological Reporter to the Govt. of India.
Simla, the 5th October 1885.

THE DECOMPOSITION OF MILK.

[BY PROFESSOR SHELDON.]

THE decomposition of milk, as of anything else that is susceptible of decay, is a dissolution of partnership, so to speak, between the different elements of which the decomposing substance is made up. The elements begin to assume new forms or conditions, and to enter into new arrangements or combinations; some of them, being of a volatile character, escape into the air, in the form of gases which, when the decomposition is in an advanced state, are commonly more or less offensive to the smell, and the rest are so far changed as to leave but little resemblance or no resemblance at all to the original compound. There is a separation of the solid from the liquid, and of the gaseous from both; they all become chemically dissolved, as we may say, individually and collectively, and enter into new combinations when they are free to act in accordance with the natural laws to which they are ordinarily subject. Milk is well-known to be one of the most quickly decaying things we are acquainted with in every-day life, perhaps more so than any other, and various precautions have to be taken with it, in order to keep it fresh or undecomposed, until its most valuable constituents have been extracted and put into a form, as in cheese and butter, which arrests the process of natural decay.

We do not at present fully understand the subject of the decomposition of milk, but it is known to be brought about by the action of micro-organisms of one kind or another, known as bacteria, bacilli, micrococci, &c. It has been demonstrated by German scientific men that milk may be preserved antiseptically —that is, without the aid of any kind of preservative; and this view of the case goes to show that the reason why milk is so quickly perishable is not found in any inherent property it may contain, but because it is a congenial food, so to say, for the fermentive organisms, which are the active decay-agents in respect of substances that are rich in nitrogen. But in order to preserve milk in this way, greater care is necessary to be taken than can possibly be forthcoming on the part of those who are practically engaged in dairy work. The micro-organisms which operate in the decomposition of milk are found floating in the air in myriads, and in order to preserve milk antiseptically, it must be kept wholly and absolutely away from these organisms, or they from it. If none of these organisms are allowed to gain access to the milk after it is taken from the cow, the milk will remain sweet and unchanged for a considerable time; but when we consider that all atmospheric air is naturally full of them, it becomes obvious that to keep milk wholly away from them is a difficult matter, involving a process of air-purification, and of rigid care in transferring the milk from the udder of the cow to a vessel containing the purified air and none other.

Milk turns sour and decomposes, because the germs spoken of are not kept out of it. They are present in the air, and take possession of the milk the moment the chance is offered to them. Sour milk is found to contain them in abundance, and a small portion of such milk will cause fresh milk to turn rapidly sour, if the two be mixed together. It is the little leaven leavening the whole lump—a parallel as true as it is admirable, and scientifically correct. Hence it will be seen how necessary it is that all vessels used to contain milk should be carefully cleaned each time after using them. The fermentive germs may be destroyed if the milk be heated for an hour to 70 degs. Centigrade, or 158 degs. Fahr.; or the same end may be accomplished by a temperature of 100 C., in three-quarters of an hour; but other germs will quickly introduce themselves into the milk as it cools, and the heating process will have to be repeated to keep the milk sweet day after day, and for an indefinite time. To boil milk, however, is not to improve it, save in respect of those decay-germs. Boiling precipitates the serum and albumen, makes the milk less easily digestible, and, in the process of cheese-making, reduces the rate at which rennet brings about coagulation of the casein. These undesirable effects are comparatively unimportant in degree, no doubt, and not comparable to the good which the boiling does in reference to the preservation of milk. Milk was intended by nature to be conducted from the teats of the parent into the stomach of the offspring without coming into contact with the air, and hence it is that the boiling of milk does good in killing the germs that milk absorbs from the air.

An interesting series of experiments might be made on milk in reference to cheese-making, and also to butter-making, but specially to cheese-making, with the view of determining the effect which these micro organisms have in the process. We know that really good cheese cannot be made from tainted milk; and yet all milk from which cheese is made contains the germs which bring about the tainted condition. We know, too, that the process of cheese-making is identical, up to a certain point, and differing only in rapidity, with the process of digestion in the stomach of a calf—that is, the milk is coagulated in both instances by pepsine. But no one has yet demonstrated the difference in the coagulum of milk that has been exposed to the air, as in cheese-making, as compared with that of other milk that has not been so exposed, as in digestion. Such a demonstration can only be made on a small scale where an ordinary atmosphere prevails if indeed it can be made at all, for there would be immense difficulty in completely excluding the one sample of milk wholly apart from the influence of atmospheric germs. We are consequently utterly deficient in experimental data as to the effect of these germs on the cheese, for no cheese was ever yet made, so far as I know, from which their influence was wholly excluded. But the experiment might conceivably be made by taking a given quantity of milk up into the higher Alps, for example, boiling it there to kill the germs, and then making it into cheese; for in the higher Alps the air, as Professor Tyndall found, is naturally free from the germs of which I have spoken. It is to be hoped that our German friends will undertake this experiment with two equal samples of milk, one to be made into cheese in the valley, and the other high up in the mountains.

It may be said that we have no milk, obtained in the ordinary way, in which it is brought instantly into contact with air, that does not contain some of the micro organisms to which reference has been made. One variety of these organisms, acting on the sugar of milk, produces lactic acid; and the curding of milk in the process of souring is the result of the action of the germs on the sugar of milk, which produces lactic acid, the acid in turn operating on the caseous element by way of precipitation. Other bacilli, which do not act directly on the sugar of milk, operate instead on the lactic acid, and produce butyric acid; and in this way we have butyric acid as a successor to lactic acid, the product of butter being injured in the process. Others, again, operate in the casein of the milk, producing a kind of fermentation which depreciates the flavour of cheese. I have spoken of the purity from organisms of the air of the Upper Alps, for the higher we ascend from the valleys the smaller become the numbers of the organisms in it; and in connection with this natural fact it would be pertinent to predicate the peculiar excellence of Gruyere and Emmenthal cheese, the best of which is made in some of the high passes and slopes of the Alpine range, the air of which is comparatively pure as compared with that of the valleys. It is beyond doubt that the germs in question perform functions in the dairy, whose importance is far greater than people have any idea of, and from this we may fairly argue the need of scrupulous cleanliness, in order to reduce, as far as may be, the mischievous effect of the decay agents which are employed in Nature's laboratory.

It must be remembered that milk decomposes soonest at about the natural temperature of it, under the influence of the agents to which it is subject, and that cooling or heating of milk each retard its decay. From 95 degs. to 108 degs. Fahr., or 35 degs. to 42 degs. C., supply temperatures in which bacilli are most active. The heating of milk, as we have seen, destroys the germs; and the cooling of milk greatly reduces their potency, until at a low temperature their vitality is entirely suspended, though not destroyed. There are three courses open—1, to keep the germs out of the milk; 2, to destroy them by heat; and 3, to suspend their vitality by cooling. The first is only theoretically practicable, save in a chemist's laboratory; but the other two are within the reach of any dairy operator. The introduction of the germs into milk is lessened in volume by keeping all vessels scrupulously clean, in which event the bacilli obtain access only from the air, and not from particles of old milk which may otherwise adhere to the vessels. Cooling the milk, too, has the effect of reducing or entirely suspending the activity and multiplication of the germs, for they are reproduced rapidly and in vast numbers at a suitable temperature in such a congenial fluid as milk. Not only the vessels which contain the milk, but also the rooms which contain the vessels, should therefore be kept clean and cool, in order that the germs may have no lurking places, and no suitable temperature in which to breed and multiply.—*North British Agriculturist.*

THE BALATA INDUSTRY OF BRITISH GUIANA.

THE following interesting account of this new industry, taken largely from the Report of Mr. J. S. Jenman, Superintendent of the Botanic Gardens at Georgetown, we copy from a recent number of the *South American Journal*:—

Many causes have retarded the development of the colony, notably want of population. But the extraordinary growth of the system of importing population and thereby labour is remedying this cause, and will in time, it is hoped, remove it. The system is keeping pace with the progress of the colony, and will continue to do so. Another cause is the entire devotion to the cultivation of sugar. The Guianese, from the planter to the negro labourer, are, practically speaking, monomaniacs. All their eggs are in one basket. The recent severe depression in the sugar market has forcibly illustrated the danger of this policy. To say that the colony has been brought to the verge of ruin is an exaggeration. Ruin has, however, stared the colony in the face, and may in the future accomplish what it has recently threatened, if the colony does not take the lesson to heart and develop its other resources. Herein is ample room for the employment of British capital and the exercise of British enterprise, energy, and industry. As our readers are aware, the cultivation of sugar is confined to the mud flats of the sea coast and along the banks of the rivers. The forest interior, save by a comparatively few wood-cutters, is unutilized, its wealth and resources undeveloped. It is to one of the products of the forest—balata—we would now desire to draw attention. Balata is the milk exuding from the bullet-tree (*Minnusops balata*) upon the bark being cut, and when dried has a chemical composition, according to Dr. Hugo Nutter, F. R. S., probably identical, with that of gutta percha and of caoutchouc. Intrinsically it is the most valuable substance of the kind known, but the fact of it not being placed in the market in sufficient quantities precludes its use. In Dutch Guiana an American company has obtained a large grant of forest, and is obtaining some 50 cents per pound for balata, with the assurance that the price will be considerably increased if a permanently sufficient supply is forthcoming.

British Guiana affords excellent facilities for the pursuit of the industry. About 100 miles of the low alluvial forest region of Berbice, on either side of the Canje river, is thickly studded with belts of bullet-tree. The hardy and plucky Dutchmen pushed up the Canje and worked estates there, but these, after emancipation, fell into the hands of negro communities, who in keeping with their habits, let the estates ruinate, but who still inhabit the scattered villages along the banks of the river. It is these people, aided also by negroes who come under contract from the mouth of the river, who collect the balata. A quarter of a century since the industry did not exist. Scarcity of India rubber led to the value of the milky secretion of the bullet tree becoming known. Messrs. Silver and Co., of London, were among the first to recognise its utility, and as with all new products, it has experienced varied fortunes. That it has not won its way in the market is due to the fact that it has not been produced sufficiently. It is with the hope of stimulating inquiry into the industry that we subjoin a few particulars gleaned from an exhaustive report upon the subject to the Government of British Guiana by Mr. G. S. Jenman, the accomplished botanist to the Government. The bullet-tree is a large forest tree, reaching to a height of 120 feet, with a trunk 60 to 70 feet long and 4 to 5 feet in diameter, said to range from Jamaica and Trinidad to Venezuela and French Guiana. It is allied to the gutta percha trees of the Malayan Archipelago, from whence comes the present supply of gutta percha.

The bark is about half an inch in thickness, and bears deep parallel fissures about an inch apart, and with longitudinal fissures. The wood has a red tinge, and is one of the hardest and densest the forest yields, and squares up to 3 feet 6 inches. Says Mr. Jenman:—

"The trees are more plentiful in the depths of the forest than near the rivers, hence the creeks form arteries to the balata grounds. Several of the creeks on both banks of the Canje are instances of this. The wood-cutters regard the bullet-tree as inexhaustible; in the interior of the forest it exists in profusion, and abundance lies beyond the reach of the balata collectors as they at present conduct their operations. As the trees near at hand become exhausted, they will no doubt alter their habits, and make clearing as drying places in the heart of the forest, but now they are under the obligation of returning to the settlements on the creeks with the milk they have collected to dry. Under this necessity they can at most only penetrate about two days' journey, but so far as they have explored, they report there is no diminution in the abundance of the trees. The forest at this depth of course has never been touched by wood-cutters, as for convenience in getting their timber out, they have to confine their operations to the banks of the river and creeks, rarely going in more than a mile or two."

Many of the giant bullet-trees, Mr. Jenman does not doubt, have braved the vicissitudes of fortune for hundreds of years, nor should he regard it as improbable that some even saw the birth of the Christian era. He himself shall describe the manner of collecting the balata:—

"I have mentioned that the river inhabitants are of slave descent. They are consequently negroes. The collectors who come from other quarters are of the same race. They are typically hardy, well-built fellows, capable of heavy work and possessing great powers of endurance. As they meet in the early morning while the settlement was still thinly enshrouded in the mist which the sun just rising over the forest was beginning to dissipate, equipped for their work, I had frequent opportunity to note at one and the same time their physique, dress, and the tools and appliances required in the trade, as well as in my intercourse with them in the forest. Their garments are few, and if they afford little protection from inclement weather, they are adapted not to impede their movements in the forest. They consist usually of a cap that fits the skull and forehead tightly; a thin singlet over the body, also skin-tight; and a pair of Osnaburg trousers that reach just below the knees. The feet are bare. Around the waist a belt is worn which supports the trousers, in which a sailor's sheath-knife is fixed, naked; and dangling by a short piece of string is a bamboo tube about 4 inches long and an inch thick plugged and inverted to keep out rain, containing matches. In the right hand a cutlass is held by the handle with which the holder, as he stands waiting, chops idly at the nearest stump or tree.* Over the left shoulder is an axe, on one end of the handle of which is strung two or three goobees in which the balata milk is carried home from the forest and on the other end the coil of calabash basins used in collecting it. If breakfast is taken it is carried in a covered tin saucepan which hangs by the curved iron-wire handle in the other hand. So equipped, the collectors start for their day's work, and it is surprising with what rapidity and care in spite of their very cumbersome impedimenta they thread their way through the thick forest when the ground is at all fairly good for walking. The axe is required for felling trees, and the cutlass for making the channel in the bark by which the milk is obtained. The cutlass is a large instrument twenty-two inches long, curved and rather wider at the outer end, where it is about three inches deep. The axe is the ordinary American kind used by woodcutters. The goobees are natural bottles, the size and shape of an ox bladder, holding from one or two gallons each. They are produced by a gourd—*Lagenaria vulgaris*—which grows in the sand at most Indian settlements, much like pumpkin vine. A hole is cut, about two inches in diameter, near the scar where the stem was connected to the fruit, and the contents of seed and pith scraped out by inserting and twisting a piece of stick or other sharp instrument. This leaves a strong hard shell which for its protection, and as a means to affix a handle is then laced in an open network of mamourie—the split stems of a climbing *Carludovica*—to which a rather long curved handle of the same material is attached that enables it to be carried over the shoulder of the collector. On the return journey they are balanced by being hung before and behind, usually two each way, and the rapid traveller has to be careful that he does not slip, make a false step into one of the coquerite pit-falls, or trip into collision with a tree, for they are easily cracked by a blow thus given, and the milk at once escapes. When filled the orifice is stopped by a cork cut from the bullet-tree bark, round the edges of which clay is rubbed to prevent any leakage by jolting on the way. The calabash—*cresento cujete*—basins are prepared much in the same way, only in their case the fruit is split in two, and the pith and seeds then removed. In being divided some of them crack and break unequally, but all the pieces large enough to hold any milk at all worth considering are saved for use. For carrying, the calabashes are threaded together by a hole bored just under the rim; but sometimes they are taken in a bag.

These are generally the only appliances required in the forest for collecting, but in some cases ladders are used for reaching higher up the trunks of the trees that are bled standing than the collectors could reach from the ground. These are made on the spot when required. They are very rough and temporary constructions consisting of two poles from ten to twenty, or rarely thirty feet long, connected by two or more cross-bars, the steps being tied on or made of bush-rope laced to and fro. From their rickety character accidents sometimes occur in using them, and sprained limbs or ribs are the results. For drying the balata at the settlements shallow trays are employed. They are made of wood, are four inches deep, 18 to 24 inches wide and 2 to 4 feet long. The joints are sealed to prevent leakage by drying a film of balata over them. Oil, grease, or soap is then rubbed over the surface to prevent the milk sticking as it dries. At stations where balata is largely purchased special drying sheds are erected. These are open-roofed thatched buildings, with open sides. A floor, about 2 or 3 feet from the ground, is made of crossbeams upon which the trays stand. Down the middle a passage is left, so that each tray can be conveniently reached for taking off the sheets of balata as they dry, either from the inside or outside of the building. Where a smaller quantity is dried, the trays are arranged around the open sides of the dwelling-houses, kitchens, &c., just inside the eaves. Two or three feet above the trays, horizontal wooden bars or lines of bush rope are stretched, on which the sheets of balata are hung to drip as they are taken out of the trays, when the underside is still in a milky fluid state. When the milk accumulates faster than the means of drying will accommodate it, barrels are used to receive it till the trays become vacant."

At present the collectors often adulterate the balata by the addition of water and other substitutes to increase its weight. What is really wanted is British capital and British supervision. By this means the industry could be systematised, and a sufficient supply of balata placed in the market to ensure its use. That it is a lucrative industry of the future, there can be little doubt. Who will lead the way in making it a lucrative industry of the present?—*Sugar Cane.*

DISSOLVED PERUVIAN GUANO.

The following letter will interest our planters:—

"Woodford Lodge" Estate,
Trinidad, 11th June, 1885.

Messrs. A. Cumming & Co., Port-of-Spain.

Dear Sirs,—Having asked me to state my opinion as to the merits of Messrs. Ohlendorff's "Dissolved Peruvian Guano," I do so now.

I first applied a large quantity on the St. Clair Estate, Arouca, in 1881, to both plant canes and rattoons, at the rate of 4 cwt. per acre. The result obtained in 1882 from the canes so treated was satisfactory; the crop, 774 hhds. being the largest that that estate has made either before or since. The average yield per acre was, as well as I can remember, nearly 2 hhds. Subsequent, while managing the St. Clair Estate, I applied other manures, but never obtained from their application the pleasing result which accrued from the use of Ohlendorff's Guano.

Last year (1884) I obtained from you 58 tons of the Dissolved Peruvian Guano (Ohlendorff's), which I applied to the canes of this estate (Woodford Lodge). The application, both as regards mode and quantity, was identical with that pursued at the St. Clair Estate, with a result even more gratifying, the Crop (830 hhds.) was obtained from 146 acres plants and 230 acres of rattoons—50 acres of the former were planted only thirteen or fourteen months before they were reaped, and gave an average return of 3 hhds. per acre—nearly all these canes had no other manure than the Dissolved Peruvian Guano.

I found the juice very rich in saccharine, weighing as high as 11 degrees Beaume. I recommend as early an application of this manure to both plant and rattoon canes as possible, for I found that the fields which received this manure ten months before cutting, gave a riper and consequently a heavier cane than those which I manured later.

For rattoons I advise two applications of 2½ cwt. per acre each, with an interval of ten weeks between each application.

For plants I think one application of 4 cwt. per acre, applied when the young sprouts are two or three months old, will produce a favourable yield.

I have ordered from you 60 tons of this manure for crop 1886, so persuaded am I that it is the best and safest fertilizer I have yet met with.

I am yours faithfully,
(Signed) S. Henderson.

—*Sugar Cane.*]

THE VALUE OF TIMBER AFFECTED BY SITE OF GROWTH.

In the course of a lecture "On Timbers and their Uses" before the Chamber of Manufactures at Adelaide, South Australia, Mr. Hack gave several telling instances of the importance of the above theme. In that colony it was necessary to consider the effects of the climate upon wood, and it could not be expected that because certain timber stood well in England it would be equally good at the antipodes. Great extremes of heat and cold were very trying to wood, and in a warm climate insects such as white-ants or the marine teredo were much more destructive than in places further distant from the tropics. Timbers that would withstand exposure to the weather or the ravages of insects were especially valuable, and of this class red gum and jarrah were the best known and most used for general and outdoor purposes. If the trees and the locality of their growth were properly selected, these timbers were practically imperishable. The red gum from the Mount Lofty ranges was, as a rule, well-grown, straight and close-grained, and of a good colour, though even here there were trees quite unfit for the sawmill. That produced on the Murray Flats was very unreliable, and though the Victorian forests contained large quantities of good timber, so little care had been exercised in the selection of trees that it had been prohibited from use in Government contracts in South Australia. Western Australian jarrah, locally known as Swan River mahogany, which was greatly relied upon in this colony, grew in the south western districts of Western Australia, the vast granite and ironstone ranges south of Perth being covered with forests of these noble trees, thousands of them with trunks as straight as a mast for 50 or 60 feet and from 10 to 15 feet of girth. Great care, however, was necessary in selecting and cutting the trees, those grown on the slopes of the ironstone ranges being the best. The most reliable timber was not always procured from the largest trees, those of smaller growth giving on an average a turn-out of about 200 cubic feet of clean timber. The reputation of the jarrah was fast spreading, and it had been described by standard writers on the subject as unsurpassed where special tests were necessary. The karri, also from Western Australia, had come into prominence recently, and gave promise of rivalling jarrah in importance. So far it had not been much used in South Australia for general purposes, but the timber inspector to the Admiralty (Mr. Thos. Laslett) gave karri a very high position. The tensile experiments placed it much higher than jarrah. A piece of each wood

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[*] At every house and settlement on the river every tree near at hand—even cocoanuts, coquerites and other palms—has been chipped in idle moments, or by novices for practice, in the manner the bullet trees are bled.

2 × 3 × 30 inches showed about the same specific gravity, and while the jarrah broke with a weight of 11,750 lbs. the karri withstood a load of 23,280 lbs. The averages crushing weight to one square inch was stated to be—jarrah, 3·108 tons; and karri, 5·140 tons. In a list of timbers suitable for shipbuilding purposes, emanating from Lloyd's, East Indian teak was classed at fourteen years; karri, jarrah, oaks from English, Adriatic, Italian, Spanish, Portuguese, and French forests, together with morung, saul, greenheart, morra, ironbark, Penang cedar, etc., were classed at twelve years; whilst other European oaks, white oak, mahogany, Spanish chestnut, and blue gum, pitch-pine, larch, etc., are allowed nine years. Baltic pines, spruce, and Scotch firs were placed as low as six years. Singapore cedar was another well-known wood that had been extensively used in South Australia, but it had gradually lost its reputation, owing principally to careless selection in the forests. There was no timber that varied so much as this, the red coloured, close-grained wood being equal to the best jarrah, and much more easily worked, while the light spongy wood was absolutely valueless. The sugar gum from the Wirrabara forests had latterly been brought into use in some of the public works in the colony with fair success, it being a close-grained wood much like the best blue gum, and according to the Conservator of Forests it had very satisfactorily withstood the attacks of insect. Blue gum was very much akin to the sugar gum, and that from the Mount Lofty range was principally used for "felloes," which, if cut from carefully selected and seasoned timber, were unsurpassed. Much of the so-called blue gum imported was very inferior, and cargoes from Corner Inlet and Tasmania had proved no better than stringy bark. The wood shrank, cracked, and had twisted and had lowered the reputation of blue gum. Ironbark and spotted gum from New South Wales and Queensland were good hard timbers, especially adopted for girder work, and obtainable in lengths up to 60 feet. They were very durable, and capable of sustaining great weights, but were unreliable when exposed to white-ants or marine insects. West Australian tuart was a splendid quality of timber, very heavy and dense in grain. It was unequalled for scantling, and was largely used for the heavy portions of railway trucks, etc. Blackwood was strong and durable, being used for railway trucks and coach-building, especially for wheels in light traps. It bends readily when steamed, and was taking the place of American hickory. Once insects obtained entrance to a building, the timber of which was suited to their palates the result was disastrous, and hence arose the necessity of knowing the woods that they were least likely to attack. For this reason he (Mr. Hack) had particularly noticed the red gum, jarrah, karri, and Singapore cedar, the others mentioned not being so proof either against insects or rot.—*Forestry*.

CORKS AND CORKWOOD.

There exists in the art of bottling no more prominent factor than the cork.

And yet it is extremely doubtful if one person in ten—yea, one in a hundred—of all those who are called upon to handle this useful article, either in connection with bottling or otherwise, has any definite idea of its history, the mode of its culture and preparation, or the multitudinous uses which it is called upon to serve.

To such as are enlightened upon the subject it must always be a matter of wonder what the world did before corks were invented.

Did the ancients have bottles? If so, with what did they seal them? for it is difficult to imagine any article that could fully supply the place of cork.

A glance, therefore, at this subject, viewed from a historical and agricultural standpoint, may not prove uninteresting reading to those whose interest our paper is endeavouring to serve.

First, let us glance at the history of cork.

It is certain that its culture and use was familiar to the ancient Greeks and Romans, though it was not largely employed by them as a stopper. This was owing to the peculiar nature of the bottles employed, which were made of leather, or often of the undressed skin of the goat or kid.

The method of making those bottles was to strip the skin of a goat from over the neck of the animal, leaving it otherwise nearly without holes such as there were, being formed by the legs, and were easily closed. These primitive bottles are used by the Arabs to this day.

In the form of stoppers for general use, corks were introduced towards the end of the sixteenth century, since which time the industry has not ceased to grow in importance.

The back of all trees consists inwardly of a parenchymatous, or soft cellular tissue, and outwardly of a harder, woody, tubular tissue, the latter generally being more abundant. If the growth of the parenchyma be prolonged and rapid, it will assume a more or less corklike character, as is true in the case of some of the elms, the common oak, and many other trees.

This peculiarity is developed to an exceptional degree in one species of oak, which has been named, from this circumstance, *Quercus suber*: It is the bark of this tree which constitutes the cork of commerce.

The cork oak is an evergreen, growing to the height of about thirty feet: its acorns are edible, and resemble chestnuts in taste. It does not require a rich soil, but, on the contrary, seems to thrive the best on poor and uncultivated ground.

It is principally found in France, Portugal, Spain, Tuscany, the island of Sardinia, and on the African coast bordering on the Mediterranean.

The cork used in this country comes entirely from Spain and Portugal—the provinces of Catalonia and Estremadura in the former, and Alentejo in the latter country, furnishing the most abundant supply.

The Portuguese cork is inferior to the French in quality, but superior to the Italian, being lighter and whiter. Sardinia produces a kind easily distinguished by its color and weight, being pinkish hued, and heavier than many other varieties. It is considered by the English the best variety which can be obtained, but little, if any of it, comes to the United States. In 1861 it was reported that the cork forests of Sardinia and Corsica had been in a great measure destroyed by improper working; but this report, like the anne rumored failure of the peach crop in Delaware, seems to have made little difference in the supply.

France produces the finest grades of cork, especially in Languedoc province and the environs of Bordeaux. The peculiar velvet cork, so esteemed in the bottling of champagne, is the production of those places, and is becoming very scarce, it being feared it will, in time, become unobtainable.

Africa produces large quantities of cork, but of an inferior grade, although the soil and climate of its northern countries seems peculiarly favorable to its propagation. This is especially true of Morocco and Algiers. The causes of this are to be found in the uniformly high temperature and profuse nightly dews, while the dry, warm, open hillsides are covered with a sufficiency of light soil, peculiarly adapted to the growth of the trees, which attain to a larger size here than elsewhere.

There are said to be 2,500,000 acres of cork forests in Algiers alone, of which about 300,000 are utilized. It is said to be capable of producing as much cork as all the rest of the globe, if the inhabitants could but be persuaded to remain peaceable, and give their attention to agricultural pursuits.

In 1859 an attempt was made to introduce the cork oak into the United States, Portuguese acorns being planted, with this end in view, in Wayne County, Miss. All grew, the largest trees, eleven years later, measuring thirteen feet in height, while the trunks had attained a diameter of eleven inches in thickness, the cork bark being more than an inch in thickness. In 1872 the planting of cork trees was attempted in southern California, but with what success does not appear.

Among the conditions necessary for successful cork culture, climate and soil are of the foremost importance.

In the Mediterranean basin, where it is indigenous, the tree favors altitudes varying from 1,600 to 3,200 feet. It does not flourish beyond 45° north latitude, and the minimum temperature must not be less than 55° Fahrenheit.

It grows best on southerly slopes, which afford a freer circulation of light and air than do flat lands. It requires abundant sandy soil. Planting is usually performed from seed; as a rule the large, sweet acorns developing into the best trees, which yield the finest cork, the small, bitter acorns producing trees of a coarse and inferior nature.

The most approved method of planting, and that which is employed in France, Spain and Portugal appears to be the furrow or "hill" system, which consists in sowing the acorns twenty to forty inches apart, in a furrow between two or more grapevines, placed at from five to seven feet apart. The sowing and planting are conducted simultaneously, the vines affording the shelter which is so necessary to the cork tree during its early growth. The young trees are thinned out as required so as to afford abundance of air and light to each. About fifty trees to the acre are recommended by the French cork producers, and the production is about eighteen pounds to each barking of the tree.

The distinguishing feature of the cork oak is that the parenchyma forms the mass of the bark, while the contrary is true with nearly all other trees. In the earliest state of its growth it is much more elastic than it ultimately becomes, owing to its containing in the first instance a large proportion of woody matter. The outer casing of the bark is formed during the first year's growth, and does not subsequently increase; but the parenchyma or inner bark continues to grow as long as the tree is alive.

In consequence of this phenomenon, the pressure of the growing inner bark beneath, forces the outer shell to split and peel off in flakes. The substance thus shed under natural conditions is known as "Virgin corks." It is very coarse and of woody texture greatly resembling the bark of the California live oak in appearance. Its uses, from its coarse nature, are very limited.

The removal of this outer bark from the tree is fortunately when performed in a judicious manner, unattended with any evil consequences to the tree; on the contrary, the operation seems to hasten and assist the growth of the bark, improving its quality, and at the same time the tree grows more vigorous, and attains greater longevity, trees which are regularly barked being known to live to the age of one hundred and fifty years and upwards.

The age at which the first stripping may be attempted varies with the locality, from fifteen to thirty years, the former being the most general.

The yield much resembles the naturally shed virgin cork, and is commonly included under the same term. Subsequently the barking is repeated at intervals of eight and ten years, the quality improving on each occasion. The second crop is also still too coarse for any but inferior uses.—*Independent Journal*.

Holloway's Ointment and Pills.—Ever Useful.—The afflicted by illness should look their diseases fully in the face, and at once seek a remedy for them. A short search will convince the most sceptical that these noble medicaments have afforded ease, comfort, and oftentimes complete recovery, to the most tortured sufferers. The Ointment will cure all descriptions of sores, wounds, bad legs, sprains, eruptions, erysipelas, rheumatism, gout, and skin affections. The Pills never fail in correcting and strengthening the stomach, and in restoring a deranged liver to a wholesome condition, in rousing torpid kidneys to increase their secretion, and in re-establishing the natural healthy activity of the bowels. Holloway's are the remedies for complaints of all classes of society.

THE FOREST COMMISSION.

THE following questions have been framed for the examination of witnesses at the Forest Commission :—

A.—THE PRACTICE OF RAB.

1. Can you describe variations from the method of collecting, preparing and spreading the materials as described in the "Notes?"

2. Describe varieties of rab and quasi rab other than those mentioned giving points of difference and the explanation of variations, if possible.

3. The "Notes" show that custom varies as regards the treatment of the seed bed. In some localities it is kept unchanged for years ; in others the site is yearly shifted, and in cases where the former custom prevails with respect to rice, the latter in the same locality is followed with nachni and other hill grains. Again, in places the seed bed is not touched till after the seed has been sown, while in others it is ploughed and the upper layer of earth scraped off before the rab materials are spread. How do you account for these differences in practice ? Is the one wrong and the other right ? Or are both justifiable, the differences being attributable to varying circumstances of soil, climate and the like ?

4. Ain loppings are considered the best material for rab, after cow dung. How do you account for this opinion ? You will notice that the experiments, as far as they have gone, appear to give small support to the superiority of ain. Can you divide the various trees and shrubs used for rab into (1) superior, (2) middling, and (3) inferior ? Adduce grounds for your classification.

5. Are the quantities and proportions of the materials, as used in the experimental plots, according to your ideas just and sufficient ? How do you account for the absence of accessories in cow-dung rab at Igatpuri and in other localities, if any, where the accessories are not customary ?

6. Is leaf rab practised in any locality with which you are acquainted as a substantive variety of rab ? If not, how are leaves utilized and to what extent ?

7. In the case of sheep-dung rab, why is the manure not burnt as in the case of cow-dung rabs ?

8. Do you agree that soil and other circumstances, rather than the character of the rab, determine the variety of the rice ?

9. How far do you think the area of transplantation with different kinds of rab can be equalized by the quantity of seed sown ? Do the areas of transplantation, as shown by the experiments, harmonize with your experience ?

10. How do you justify the necessity of rab ?

11. Can you suggest any improvement in the practice generally or in any particular locality ?

12. If rab experiments are repeated next season, what alterations in the plan and arrangements made by the Director of Agriculture would you advise ?

B.—CLIMATIC AND GEOGRAPHICAL LIMITS OF RAB.

13. How far do (1) the duration, (2) the character, (3) the amount of the rainfall affect rab ?

The notes show that rab is practised in districts with a rainfall as low as 68 inches. Can you name localities with a less rainfall where the practice is prevalent, and can you show that it is not customary in districts where rice is grown and where the rainfall is much heavier ? How do you account for its absence in the latter case ? *e.g.*, in parts of Dharwar and Kanara ? Why is rab used for rice in sweet land and not in salt marsh rice land ?

14. Do you think that districts which are exposed to the heavy burst of the South West monsoon especially dependent on rab ? If so, why ? Again, do you think that those districts which are out of the reach of the north-east rains need rab on that account ? How far do you think that the storage of water in tanks makes rab unnecessary ?

15. Do you think that rab could be introduced with profit into localities where it is not now customary ?

16. How do you explain the *dhulvaph* practice of sowing rice ?

17. What relation does *dalhi* or *kumri* bear to rab ? Is one the practice of inferior cultivators and the other of more intelligent farmers ? Is rab an improvement on dalhis ? Which is the older form of cultivation ? Could rab be substituted in places where dalhi is now practised ? If not, why not ?

18. In any locality with which you are acquainted, where rice is grown partly with and partly without rab—other than localities where salt march rice land causes the difference—how do you account for the gradual disappearance of rab ? Do the finer sorts of rice vanish with the rab ?

C.—GENERAL

19. Why are fallows on hill lands and other *varkas* customary ? Is exhaustion of soil, or increasing of weeds, or absence of rab materials the cause ? Or are there other explanations ? Describe as many distinct rotations of crops on hill land as you can, stating the locality.

20. What is the duration of fallow ? What are the circumstances which necessitate longer fallows in one locality than in another ?

21. To what extent do cultivators utilize occupied varkas for the growth of rab materials ? Can you suggest any feasible plan by which they could be induced to allot a portion or a larger portion of occupied land to this purpose ?

22. Do you think that the poor hill lands now cultivated with nachni and other similar crops pay true rent, in other words, leave a profit to the cultivator after a fair deduction for cost of cultivation ? If so, what proportion of the true rent is absorbed by the assessment ?

23. Would you limit the extension of rice and hill grain cultivation ? If so, how and to what extent ?

24. How far do you think that practically a substitute for rab either by the use of chemical or other concentrated manures can be found ?

25. Is rab used for other crops than rice, nachni and varai ? Is it ever used for sawa barag, bhadli and the other smaller millets ? Why not ? Under what conditions are nachni and varai grown without rab ? Are they ever grown on the transplantation ; when the seedlings are not raised on a rabed seed-bed ?

26. In connection with rab you are at liberty to put to yourself any other question than those given here, and to give your reply ; and you are requested to do so.

E. C. OZANNE,
Director of Agriculture, Bombay.

AN AMERICAN PEACH FOREST.

MR. JOHN H. PARNELL, a great American peach-grower, has been letting out some of the secrets of his peach forest, which may have more interest as Mr. John Parnell is the brother of another and more famous member of the family, Mr. C. S. Parnell himself. "In my early days," said Mr. Parnell to the correspondent, "I was advised that there were excellent chances for investment in the South, and especially in Georgia. It was my idea that thus located there was money in cotton, so I paid cash down 12,000 dols. for 1,500 acres. To this original purchase I have since added 500 acres, making my possessions 2,000 acres in all. For three years I planted cotton, only to find it a delusion." It was in this fortunate moment that Mr. Parnell made up his mind that there was money in peaches. The great peach forest is described as containing acres and acres of ground, stretching indeed into miles, covered with every variety of tree. The trees, which number 150,000, are planted twelve feet apart, and are kept trimmed to the ground, so that a person standing can pluck the rosy fruit from its fastness. When the first blush comes upon the cheek of the dainty beauties, 100 men, women, and children are set to work, each armed with a flat basket, returning to the rendezvous when the bottom is covered. Thus they keep on day after day until the season is over. The story of Mr. Farnell's venture is briefly this:—He invested 12,000 dols. in his plantation. He has spent over 8,000 dols. since in trees, seeds and labour. Upon this investment he makes from 8,000 dols. to 10,000 dols. a year, and would not sell his peach forest for less than 300,000 dols. Great as Charles Stewart Parnell is as the uncrowned king of Ireland, greater is John H. Parnell, the peach king of America. "I found it necessary to have recourse to English varieties. It was clear that a hard, firm peach which would bear handling would be a good mine. In 1871 I brought from England 6,000 budded trees—the Beatrice, the Early Rivers, and the Early Louise. I have found that these three varieties meet every requirement. I have developed a hybrid, to which I have given the name of Parnell. This peach is destined to rank in the peach family as the Le Conte does among the pears. I secured it from an accidental seedling. I made my first shipment of this peach five years ago when it went off at 25 dols. a bushel. I have now seven thousand trees of this variety. It has a dark red skin, white flesh, and is firm and hardy for shipment. The next is the Foster, a peach of yellow skin, saffron flesh, and firm mould. But one crop in three of this peach however is fit to ship. Of the Amelia peach, dark-fleshed and brownish red cheek, I have over 8,000 trees. I have spent much time in experimenting, and believed that I have now solved all the difficulties of this neighbourhood. As old trees die I replace them, and also make a regular annual increase of 25,000 trees."

"The worst enemy of the peach orchard," remarked Mr. Parnell, "is the half-taught horticulturist with a pruning knife. There is no doubt but that peach trees understand the art of growing and should be let alone. The borers will not do as much harm as the man who tries to exterminate them. If a tree yields bad fruit, just cut it down and replant. The principal danger, however, is winter killing, which is a misnomer, because the killing takes place owing to the absence of winter. Where no winter comes the sap never sinks. A sudden cold day chills the tree, just as it does a man. I have fully exploded one idea prevalent, that it won't do to plant a new orchard upon the site of an old orchard. Thousands of my best trees are standing upon ground which has been the site of half-a-dozen previous orchards. Trees set out to the north-east never fail to have fruit. Peaches flourish in alternate years, sometimes one variety, and sometimes another. In 1875 there was a wonderful yield of early peaches. In 1878 the crop was equally good, but in 1879 there was a peach famine, which caught me two ways. The famine in Ireland deprived me of my rents, and the famine in peaches deprived me of my income here. In alternate years since, with wonderful regularity, the yield has upheld the theory. The earliest shipment ever made to New York was on the 15th of May, and the latest the 10th of August, when the Delaware crop cuts off the Georgia sales."

"The demand for good fruit has never yet been met. I always have more orders than I can fill. New York is the great market, because it is the distributing point, and always offers regular prices. Philadelphia stands next as an Eastern market. Cincinnati is the great peach depôt of the West. I once got 25 dols. a crate in Cincinnati. My heaviest shipment in one day was 900 crates to the New York market. Large quantities I send by freight and small quantities by express. In one year I netted 11,000 dols. This year I have already shipped 1,000 crates."—*Pall Mall Budget.*

WHAT IS THIS DISEASE THAT IS COMING UPON US?

Like a thief at night it steals in upon us unawares. Many persons have pains about the chest and sides, and sometimes in the back. They feel dull and sleepy; the mouth has a bad taste, *especially in the morning.* A *sort of* sticky slime collects about the teeth. The appetite is poor. There is a feeling like a heavy load on the stomach; sometimes a faint all-gone sensation at the pit of the stomach which food does not satisfy. The eyes are sunken, the hands and feet become cold and feel clammy. After a while a cough sets in at first dry, but after a few months it is attended with a greenish coloured expectoration. The afflicted one feels tired all the while, and sleep does not seem to afford any rest. After a time he becomes nervous, irritable, and gloomy and has evil forebodings. There is a giddiness, a sort of whirling sensation in the head when rising up suddenly. The bowels become costive; the skin is dry and hot at times; the blood becomes thick and stagnant: the whites of the eyes become tinged with yellow, the urine is scanty and high coloured, depositing a sediment after standing. There is frequently a spitting up of the food, sometimes with a sour taste, and sometimes with a sweetish taste; this is frequently attended with palpitation of the heart; the vision becomes impaired with spots before the eyes; there is a feeling of great prostration and weakness. All of these symptoms are in turn present. It is thought that nearly one-third of our population has this disease in some of its varied forms. It has been found that medical men have mistaken the nature of this disease. Some have treated it for a liver complaint, others for kidney disease, etc. etc., but none of the various kinds of treatment have been attended with success, because the remedy should be such as to act harmoniously upon each one of the organs, and upon the stomach as well: for in Dyspepsia (for this is really what the disease is) all these organs partake of this disease, and require a remedy that will act upon all at the same time. Seigel's Curative Syrup acts like a charm in this class of complaints, giving almost immediate relief. The following letters from chemists of standing in the community where they live show in what estimation the article is held:—

John Archer, Harthill, near Sheffield:—I can confidently recommend it to all who may be suffering from liver or stomach complaints, having the testimony of my customers, who have derived great benefit from the Syrup and Pills. The sale is increasing wonderfully.

Geo. A. Webb, 141, York-street, Belfast:—I have sold a large quantity, and the parties have testified to its being what you represent it.

J. S. Metcalfe, 55, Highgate, Kendal:—I have always great pleasure in recommending the Curative Syrup, for I have never known a case in which it has not relieved or cured, and I have sold many grosses.

Robt. G. Gould, 17, High-street, Andover:—I have always taken a great interest in your medicines, and I have recommended them, as I have found numerous cases of cure from their use.

Thomas Chapman, West Auckland:—I find that the trade readily increases. I sell more of your medicines than any other kind.

N. Darroll, Clun, Salop:—All who buy it are pleased, and recommend it.

Jos. Balkwill, A.P.S., Kingsbridge:—The public seem to appreciate their great value.

A. Armstread, Market-street, Dalton-in Furness:—It is needless for me to say that your valuable medicines have great sale in this district—greater than any other I know of, giving great satisfaction.

Robt. Laine, Melksham:—I can well recommend the Curative Syrup from having proved its efficacy for indigestion myself.

Friockheim, Arbroath, Forfarshire, Sept. 23, 1882.

Dear Sir,—Last year I sent you a letter recommending Mother Seigel's Syrup. I have very much pleasure in still bearing testimony to the very satisfactory results of the famed Syrup and Pills. Most patent medicines die out with me, but Mother Seigel has had a steady sale ever since I commenced, and is still in a great demand as when I first began to sell the medicine. The cures which have come under my notice are chiefly those of liver complaint and general debility.

A certain minister in my neighbourhood says it is the only thing which has benefited him, and restored him to his normal condition of health after being unable to preach for a considerable length of time. I could mention also a great many other cases, but space would not allow. A near friend of mine, who is very much addicted to costiveness, or constipation, finds that Mother Seigel's Pills are the only pills which suit his complaint. All other pills cause a reaction which is very annoying. Mother Seigel's Pills do not leave a bad after-effect. I have much pleasure in commending again to suffering humanity Mother Seigel's medicines, which are no sham. If this letter is of any service, you can publish it.

Yours very truly,

(Signed) William S. Glass, Chemist.

A. J. White, Esq.

15th August, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's syrup which he got from me has saved his life.

Yours truly,

Mr. White.
(Signed) N. Webb,
Chemist, Calne

(B)

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VOL. X.] CALCUTTA :—SATURDAY, NOVEMBER 14, 1885. [No. 46

Health, Crop and Weather Report.

[FOR THE WEEK ENDING NOVEMBER 4TH, 1885.]

Madras.—General prospects fair; continue favourable in Bellary and Anantapore.

Bombay.—River continues to fall in Sind. Slight rain parts of Dharwar, Belgaum, Bijapore, Ahmednugger, and Sholapore; more rain urgently required for *rabi* crops in parts of Khandesh. Reaping of *kharif* and sowing of *rabi* crops in progress generally. Cholera and fever in parts of fourteen, cattle-disease in parts of eleven, and small-pox in parts of three districts.

Bengal.—No rain during the week; cold weather setting in. Outside the flooded tracts prospects of late rice harvest are generally very good. In Behar, however, want of some more rain continues to be much felt in places for rice on high lands. Cultivation of *rabi* is in active progress and crops already sown are thriving well. Price of rice has somewhat fallen in almost all districts. Fever prevalent in several localities; public health is on the whole fair.

N.-W. Provinces and Oudh.—Weather continues to be seasonable; rain would, however, be beneficial for late rice and *rabi* sowings on high lands; in a few districts *kharif* operations nearly completed, and *rabi* sowings in progress everywhere. Prices are generally steady. Cases of cholera and fever are reported from some districts.

Punjab—No rain. Fever in the Delhi and Peshawur districts and in the Kabuta tahsil of the Rawalpindi district; health elsewhere generally good. *Rabi* operations in progress; *kharif* being harvested. Prices rising in the Lahore districts, falling in the Jullundur and Peshawur districts, and stationary elsewhere.

Central Provinces.—Prospects continue favourable; *kharif* harvest and *rabi* sowings in progress. Fever in a few districts. Prices steady.

British Burmah.—Cholera severe in one district, slight in four districts, elsewhere public health good; cattle-disease slight in seven districts, elsewhere health of cattle good. Crop prospects good, except in Prome and Thayetmyo, where the rainfall has not been sufficient.

Assam.—Weather seasonable; mornings foggy. Public health good: cattledisease disappearing. Sowing of mustard and winter crop commenced; prospects of crops good, except the *sali* which has been attacked by insects in different tahsils. Common rice 13 seers 14 3/5 chittacks per rupee. Tea is doing well for the season of the year.

Mysore and Coorg.—*Ragi* crop is being harvested throughout the State, except in the Bangalore district, where it is reported to be nearly ready for reaping; standing crops in good condition. Season prospects and public heath favourable. Drinking-water and pasturage available. Cattle in good condition; murrain decreasing in the Malnad district. Prices have again slightly fallen.

Berar and Hyderabad.—Weather clear. Cotton-picking progressing; *kharif* crops in good condition; *rabi* sowings continue. Wheat 22 and *juari* 26 seers per rupee in Amraoti. *Rabi* crops are in a healthy condition in Hyderabad; *kharif* crops are ripe and fit for harvesting; *rabi* sowings commenced. General health fair, except in Patlur taluka, where fever prevails. Prices in Hyderabad—wheat 13, coarse rice 12¼, white *juari* 19½, yellow *juari* 21¼, and *tur* 15½ seers per current sicca rupee.

Central India States.—Health and prospects good. Weather seasonable; hot and dry in Sutna. Cholera in Rewa—37 cases, 21 deaths. Opium sowings continue in Neemuch, where water in wells low. Opium sowings commenced in Agar. *Rabi* sowings in full progress in Manporo, where malarious fever in some places. Prices stationary.

[illegible]jpootana.—Fever increasing in Abu. Tanks, wells, and health good. *Rabi* sowings commenced. Weather dry; cool at nights. Health much improved in Marwar, where crops suffered much from want of rain and prices tending to rise. *Kharif* extremely poor. Rain insufficient for *rabi* sowings in Kherwara where prices rising. Wheat, *mukkai* and gram cheaper in Portabgurh. Fever prevalent in Haraoti. Cholera disappeared at Pachpahar. Tanks and wells drying in Kerowlie, where fever prevalent. *Kharif* crops injured from want of rain.

Nepal.—Weather cold and clear. Rice nearly all cut. Crops excellent.

Letters to the Editor.

HYBRIDIZATION OF WHEAT.

TO THE EDITOR.

SIR,—The best experiments on the hybridization of wheat and other cereals that I saw (nearly ten years ago) were at Haddington in East Lothian by Mr. Patrick Sherriff. The results of these wonderful and successful experiments were embodied in a book entitled, "Improvement of the cereals and an Essay on wheat-fly," by Patrick Sheriff, William Blackwood and Sons, 1873, and published by subscription by the Farmers of East Lothian and Mid-Lothian. If your distinguished correspondent cannot get this book elsewhere (of which a limited number was published for the subscribers themselves), I shall be glad to lend him the copy in my possession.

S. DATTA,
Settlement Officer, Mohurbhunj.

November 7, 1885.

NOTE.—Perhaps Colonel Ommaney will communicate with Mr. Datta direct !—ED.

WOULD-BE TEA-PLANTERS.

TO THE EDITOR,

SIR,—A "Would-be Planter" may not be displeased if the replies to his inquiry come from a tea-planter, instead of from an amateur in tea.

1. The best climates for tea cultivation are those of Assam, Cachar, Darjeeling, and Western Dooars. Other climates with rainfall so well distributed over 9 months (from March to November) will do equally well.

2. The best manures for tea are (1) human excrements, (2) oil-cakes, (3) cow-dung, goat-dung, &c., (4) wood ashes, (5) above all, a good cultivation which brings out the fertilising power of a virgin soil.

3. Many proprietors live on their gardens, which as a rule pay best. The mortality of European residents does not show that tea gardens are worse than many municipalities. But gardens newly opened should be avoided, and those who cannot manage with only one or two pegs of whisky per diem had better not live on a tea garden.

4. Elevation is a matter of very little importance. The teas of the Bishnath Company have lately sold as well as those of the Dooteriah Co. (Darjeeling.) Tea-planters are inclined to believe that a higher elevation gives a *flavour* at the sacrifice of *strength*. On the whole, there is not much variation in the auction room. If Darjeeling teas fetch a better price than Assam teas, it is because the Darjeeling planters as a body understand manufacturing better than the Assam planters.

5. "What labour would be necessary?" This question cannot be answered *so easily*. With machinery, 1 to 1½ coolies per acre, and without machinery, 1½ to 2 coolies per acre may do. Some gardens yield 2 maunds of tea per acre, while others yield 9 maunds. The difference in the labour sheets will consequently be great.

6. Tea gardening is not a speculation *now*. With a *sufficient capital* and a *good knowledge* of *gardening and manufacture*, tea will pay—perhaps, better than any other business. But those who regard it as a *speculation* had better not trouble their heads about tea.

7. The would-be planters may consult Col. Money and Mr. Watson's Prize Essays, and Mr. Wyman's Tea Cyclopædia. Better still, they should spend a year on a tea garden before venturing into tea.

S. DATTA.

FOOT-AND-MOUTH DISEASE.

TO THE EDITOR.

SIR,—I have read with much interest the letter of "An Agriculturist," which appeared in your issue of the 24th ultimo, also your own remarks on the subject. In the letter in question your correspondent, in a way, asked your able correspondent, Dr. Bonavia of Etawah, for information, but as the able Doctor is still silent, I venture to offer a few remarks on the subject. Though I am not a professional doctor, I have given a good deal of attention to the treatment of cattle-disease; and from my own experience I can say that mouth-and foot disease is spontaneously developed in moist, hot climates when cattle are closely herded together: it is also liable to be generated in a *mela* (fair) and also in a crowded ship, or a long voyage, as Colonel Davies remarks. It also makes its appearance when the early rains set in after a prolonged hot season, when the cattle eat voraciously of the young, rank grass. The blood thus becomes heated from improper food, and also from insufficiency of pure air and water. It is therefore evident that the disease originates first in the digestive organs; and when the blood thus becomes affected, a kind of microscopic entoza are generated about the corona and clefts of the hoofs At first these appear to cause irritation, like itch or mange, and in this state the animal, thus affected, seeks relief by licking its hoofs. In this way the disease is communicated to the mouth and tongue, and then ends in sores, when the animals cannot eat anything. Meanwhile the disease makes rapid progress in the feet, and eventually the hoofs come off and death ensues. I think that the other symptoms described by some persons refer to an exaggerated form of the disease. The remedy is to kill only the parasitic animalculæ which cause the disease, and for this purpose I give freely bamboo and fig leaves internally. I have treated many cases with success, even in several cases when the hoofs were becoming detached from the foot. If prompt measures are taken at an early stage, the animal does not lose much in condition. Three or four days generally suffice to root out the germs of the disease.

HEM CHANDRA DUTTA.

Calcutta, November 11, 1885.

Editorial Notes.

THERE is a prospect of Travancore soon being added to the tea-growing districts of Southern India, as the tea plant has been found to grow very well there.

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The Times of India objects to the semi-official visit of Mr. Ribbentrop, the head of the Bengal Forest Department, to the Western Presidency, where he has gone apparently to study the forest flora of the place.

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We learn that some wine has been made from wild grapes grown by Mr. Barnes on the hill slopes of his Vergomont Estate near Naini Tal, which is said to have a very pleasant flavour. Some samples, which were sent to the Punjab, are said to have been highly commended.

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THE Bombay Presidency scored largely at the Antwerp Exhibition. Elsewhere we publish a list of the awards made to Indian Exhibitors. We have no doubt that this will have a very salutary effect upon Indian manufacturers, specially on those who have learnt trades in Jails. This is particularly noticeable in the carpets and tapestry class.

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IT is said to be now almost certain that the tea crop for the current season will fall short of the original estimates by at least two million pounds. After allowing about two million pounds for exports to the Colonies and America, and one million five hundred thousand pounds for home consumption, the quantity available for shipment to Great Britain is not expected to exceed sixty-three-and-a-half million pounds.

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IT is stated that at the bottom of the Raith Colliery shaft in Fifeshire, which is eighty fathoms deep, and where horses are largely employed, mushrooms grow to an enormous size. They have been partaken of cooked and made into ketchup, and suggest the idea that mushroom-growing on a large and profitable scale may be very successfully adopted "down in the coal-mines." This edible fungus is found in perfection all the year round. In France the mushroom is cultivated in caves which may not inaptly be likened to mines, such is their depth and extent.

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A LITTLE time back we had occasion to refer to the intention of the Madras Government to have Cinchona febrifuge manufactured there, under a process different to that adopted at Calcutta. We note that the Director of Cinchona Plantations, Nilgiris, has intimated that this febrifuge has been bottled off by the Medical Store Department in Madras, and is now ready for despatch to the provinces: and has requested that it should be sent out at once, with a request to the various gentlemen to whom it is forwarded to report upon its merits as soon as they conveniently can.

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"A NATIVE THINKER," writing to a Madras paper, says:—

> It strikes me that Travancore is a country where paper manufacture has good prospects for the following reasons:—
>
> It is a maritime province, highly favourable for importing and exporting, and labour is cheap. There is plenty of water-power available for machinery Clean white rags may be had, inasmuch as the population of both sexes wear *white cotton cloths* exclusively. Fibres of various sorts in the shape of materials for the manufacture are also to be had. If the manufacture is to succeed anywhere, it must succeed in that Native State. The Native Government is likely to afford reasonable encouragement to industrial enterprise.

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WE understand that the Agricultural Department at Melbourne is about to carry out an experiment on a large scale with ensilage at the Dookie experimental farm. For this purpose a silo is in course of construction 33 feet long, 18 feet wide, and 10 feet deep, built up with 9-inch walls from the bottom. It is to be divided into two compartments by a wall running through the centre so as to enable different crops to be tried. The roof is to be of corrugated iron, and there are to be two large folding doors at each end of the building for putting in and taking out the silage. It is intended that, should the building not prove a success as a silo, it is to be so constructed as to be convertible into a dormitory for the farm students.

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ACCORDING to the reports of Indigo brokers, the arrivals up to the present consist entirely of produce from the North-West Provinces and Oudh, of which about 50 chests of Oudhs have been sold privately at an advance of about Rs. 50 on last year's average prices. European indigo appears to be still kept back from the market, and the sales will probably not begin for nearly another fortnight. The outturn of European factories in the North-West will, it is expected, eventually turn out nearer three than four thousand maunds. The boiling musters from the Bengal factories promise that the quality of the crop will be decidedly better than the average, whilst those from Trihoot and Chumparun are rather better than last year, and equal to the standard, but those from Chupra are said to be inferior, wanting soundness in paste and colour.

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A CURIOUS case of foot-and-mouth disease having been communicated to a Veterinary Surgeon, is referred to by the *British Medical Journal*, which says:—

> A case is related in a German journal of veterinary medicine where a veterinary surgeon, two days after declaring a locality to be infected with the foot-and-mouth disease, having to travel in a violent east wind, employed a handkerchief to protect his mouth which he had had in use while he was examining the beasts. The next day he was seized with a violent head ache and pains in the limbs. On the second day there was fever, and a feeling of irritation in the hands and feet. The third day the fever abated, but there appeared on the tongue, lips, mouth, and edge of the nose, an eruption of an aphthous character which lasted eight days.

WE noticed a short time back the deputation of Dr. King, of the Geological Department, to report on the probability of obtaining water by means of artesian wells in the neighbourhood of Vizagapatam. We now learn that he has expressed an opinion that there is very little chance of this ever being successful in that district. But Dr. King has made an excursion to Gallikona, where he is said to have made some important discoveries as to the mineral wealth of the district, and a report on the subject is to be published after his return to Calcutta. The existence of plumbago in large quantities is pretty well established, as it is commonly used by the local potters for glazing earthenware. Some traces of gold are also said to have been discovered within a mile of the cantonment; but Dr. King's report must be awaited for full particulars.

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THE *Gazette of India* of last Saturday published the forms of application for the use of private exhibitors, received from the Royal Commissioners for the Colonial and Indian Exhibition, 1886. The Royal Commission invite applications for space in the Indian section from *bonâ-fide* merchants and manufacturers having places of business in India; but applications from importers or agents will not be entertained. Applications will also be received from persons desirous of exhibiting oil-paintings, water colours, and drawings of Indian subjects by artists and amateurs resident in India, the Commissioners defraying the cost of packing and freight from Bombay, subject to conditions set forth. A special invitation is issued for the exhibition of samples of tea, coffee, and cocoa from *bonâ-fide* planters and manufacturers, having places of business in India or the Colonies.

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THE ludicrous mistakes sometimes made by official bodies and Government officers in India, in the classification of animals and trade and agricultural products, have occasionally been noticed by us; but the following, which we take from a contemporary, is something quite out of the common .—

The hare is an unfortunate animal. In the authorised version, he is unjustly accused of chewing his cud. In a late schedule sent up by one of the Central Provinces Municipalities he is classed with partridges, peacocks, and quails as a game-bird. It is to be feared that Mr. A. O. Hume has omitted this *rara avis* from his collection. In the same schedule under "Animals for slaughter" appear bullocks, goats, sheep, fowls, and eggs. In a municipality where poor harmless eggs are slaughtered, and where the hare soars aloft among the fowls of the air, the premature appearance of thread and wool as "textile fabrics" may be passed over as an ordinary occurrence.

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"PAPER and the industries connected with it," formed the subject of an interesting address read by M. de Boutarel before a meeting of the Académie des Sciences recently. Some remarkable statistics were quoted by M. Boutarel as to the rapid increase in the quantity of pens, paper, pencils, &c., which are manufactured in Europe and the United States alone. He said that the manufacture of paper alone, which at the beginning of the century was practically *nil* in the United States, now amounts to 500,000 tons per annum, and that it is just double this figure in Europe, the value of straw, rags, and other materials used in the manufacture of the paper being about £20,000,000 He estimated the value of these 1,500,000 tons of paper, when manufactured, at £40,000,000; the note-paper being calculated at 120,690 tons, worth £6,100,000. M. de Boutarel estimated the value of the steel pens manufactured annually at £800,000, while the number of heliotype plates may be [illegible] estimated at 3,000,000—30 Paris houses alone turning out 900,000. He mentioned the number of lead pencils made every year, and though some of his figures can only be conjectural, they no doubt represent very fairly the enormous capital employed in these industries.

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A letter, dated 28th August 1885, has been addressed by the Principal of the Royal Agricultural College, Cirencester, to the Secretaries to the Lieutenant-Governors of Bengal and the North-Western Provinces and Oudh, and is published in the *Gazette of India*, to the effect that the Governing Body have passed a Resolution establishing an entrance fee of five pounds, to be paid by all out-students admitted to the College, from and after the Winter Session beginning October 6th of this year. He therefore begs the favour of this fact being taken into consideration in the terms of the contracts with all future scholars. In making thi communication, the Principal takes the opportunity of expl that hitherto the out-students have not contributed [illegible] their fees towards the maintenance of the buildings of the College. Their fees have been solely in regard of the instruction. The number of out-students, however, has in the last few years increased so considerably that, in order to meet a want very strongly felt, the Governing Body are now building a commodious out-students' common room with lavatory and locker-room attached, and it is in consideration of this large outlay and of the circumstances generally that the resolution mentioned has been passed. The comfort and convenience of the out-students and their opportunities for study also will be, he has no doubt, materially enhanced hereby.

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WITH reference to his report on the state of the season in Anantapore during the week ending the 25th July last, the Collector of Anantapore was requested to give the botanical name of the plant or tree called "Gadara," the leaves of which were stated to have been used as an essential article of food by the poorer laborers in three villages of Penukonda, where there was a scarcity of food; and also, if possible, to send specimens of the leaves, flowers, and twigs of the same. His reply was that the plant, which is also known as 'Devadaru,' was said to be *Sethia Indica*, and the point being referred to Mr. Lawson, the Director of Cinchona Plantations, he identified the specimens sent to him as belonging to the *Erythroxylon Monogynum*, or its synonym, *Sethia Indica*. We believe that this point was noticed some years ago during the last Madras famine; and Dr. Bidie refers to the subject in his little pamphlet on Coca. The enquiry is worth pursuing a little further, with the object of determining whether the peculiar qualities belonging to the Coca, of staving off hunger and fatigue, are also present in the *Sethia Indica*. A chemical analysis would settle the question, we think. In connection with this subject, we print elsewhere the correspondence which has passed between the Government of India and the Secretary of State for India. The letter from Surgeon-General E Balfour is very interesting, and contains much information.

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ONE of our American exchanges has the following regarding the present season's wheat crops of the United States :—

The Department of Agriculture's September report based on reports to Sept. 1, was given to the press on the 10th instant. As we anticipated would be the case, it makes a still further reduction in its estimates of the wheat crop, and prepares the way for a further coming down by saying "if the injuries reported in the stack should prove to be greater than is at present apparent a few millions of reduction might still accrue." Its present estimates are of winter wheat 217,000,000 bushels, and of spring 134,000,000, a total of 351,000,000 in place of 265,000,000, which was its July estimate. On the spring wheat it admits a loss from the August estimates of 3 points in Wisconsin, 5 in Minnesota, 4 in Dakota, 7 in Iowa, an average of less than five per cent, when it is well known that throughout these States, with Nebraska added, and which constitute the principal spring wheat-producing area of the country, the loss from blight, rusts, storms, and insects after August 1 was not less than from 20 to 25 per cent in quantity with an equal loss in quality. The department's estimates on the wheat crop are still in our opinion 33,000,000 bushels too high. The general condition of the corn crop is placed at 95 against 96 in August, and 94 at the same time last year. It says "frosts have done but little damage, and will be capable of little. The prospect is still favorable for a crop slightly above the average." The cotton crop suffered in August from drought and hot weather, worms, etc., and there has been a decline from the August condition in every state. The average for September is 87 against 96½ in August and 82 in September of last year.

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THOSE who are very much troubled with grasshoppers, will do well to to note the following remedy, which has been used with complete success by Professor Coquillet of the U. S. Department of Agriculture :—

"It consists of a mash composed of bran, arsenic, sugar and water, the proportions being one part of sugar one and one-half parts of arsenic and four parts of bran, to which is added a sufficient quantity of water to make a wet mash. A common washtubful of this mash is sufficient for about five acres of grape vines. Fill the washtub about three fourths full of bran, add six pounds of arsenic, and mix it thoroughly with the bran; put about four pounds coarse brown sugar in a pail, fill the pail with water, and stir until the [illegible] part of the sugar is dissolved. Then pour this water into the bran [illegible]d arsenic, and again fill the pail with water and proceed as before until all the sugar in the pail has been dissolved and added to the bran. Now stir the latter thoroughly and add as much water as necessary to thoroughly saturate the mixture, and it is ready for use. Throw about a tablespoonful of this mixture under each vine infested with grasshoppers; and in a short time the latter will leave the vine and collect upon the bran and soon commence feeding upon it. Those which are upon the ground six or eight feet from the bran will soon find their way to it, apparently guided by their sense of smell, as those to the leeward of the bran have been observed to come to it from a greater distance than those which were on the side of the bran from which the wind was blowing. After eating as much of the bran as they desire, the grasshoppers usually crawl off, and many hide themselves beneath weeds, clods of earth, etc., and in a few hours will be found to be dead. This mixture costs from 35 to 40 cents per acre of vineyard, including labour of mixing and applying it. In orchards the cost will be considerably less than this. One man can apply it to eight or ten acres of vineyard in a day."

A REQUEST of a somewhat novel character has been preferred by the lessees of the land at present being worked by the Illithorai and Karteri Gold Mining Company (Limited.) It appears that Mr. G. N. Groves, of Coonoor, and Major J. Johnstone had obtained gold-mining leases of certain lands in 1882 and 1883 respectively, and have assigned their interests under their leases to the Illithorai Company by virtue of two indentures. Messrs. Stanes & Co., the bankers and secretaries of the Company, have requested the Government to permit them to retain these lands on putta tenure at eight annas an acre, paying additional assessment for mining. The Company have agreed to pay Mr. Groves Rs. 20,000 *in fully paid up shares, plus* Rs. 880 in cash for the transfer, while in the case of Major Johnstone, the consideration is 38 shares of Rs. 100 each and no cash. The Collector of the Nilgiris is of opinion that the success of the enterprise, so far as the Gold-Mining Company is concerned, is uncertain, and has referred the matter for the orders of Government as to the question whether some encouragement should not be given as a special case; as the present rent, Rs. 810 annually, is felt to be burdensome. He has accordingly recommended that the land may be granted on putta at Rs. 2 per acre, subject to the additional assessment on the extent taken up for gold-mining, which in the present case will be 24·16 acres in Coonoor. The Board of Revenue are of opinion that the Illithorai and Karteri Gold-mining Company (Limited) may be allowed to relinquish the leases with effect from 1st January 1885, on payment of all arrears of rent up to that date, and to take a fresh lease on the usual conditions of the 24·16 acres of land required for mining purposes. The Board do not consider that any of the lands should be granted on putta, and if the Company desires to obtain them on permanent tenure, it should purchase them under the waste land rules. This has been accepted by the Government of Madras. A standing order will shortly be issued by the Board of Revenue, embodying all the orders of Government on the subject of mineral workings.

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THE reports on the state of the season and prospects of the crops for the week ending 4th November, 1885, are as follows:—Rain continues to fall in the Madras Presidency, where the prospects are now fair. In Bellary and Anantapore the crops have been much improved by the recent rain. Rain has also fallen in the Mysore State, where the standing crops are in good condition, and the *ragi* harvest is in general progress. Murrain is decreasing in the Malnad district, and elsewhere the cattle are in good condition. In the Bombay Presidency slight rain is reported from places in four districts. In Khandesh more rain is urgently required for the *rabi* crops. Reaping of *kharif* and sowing of *rabi* crops are in progress generally. No rain is reported from the Berars and Hyderabad. In the former the prospects of the *kharif* are good and *rabi* sowings have commenced; but in Hyderabad fears are entertained of damage to the standing crops, and *rabi* sowings have been postponed for want of rain. In Central India agricultural prospects continue favourable. In Rajpootana the crops are suffering in many places for want of rain. *Rabi* sowings have commenced in a few States. In the Central Provinces prospects continue favourable, and the *kharif* harvest and *rabi* sowings we[illegible] in progress. In the Punjab the *kharif* is being harvested and *rabi* sowings have commenced. Prospects are generally good. Seasonable weather prevails in the North-Western Provinces and Oudh, but the crops require more rain on highlands. The *kharif* harvest has been nearly completed, and *rabi* sowings are in general progress. No rain fell in Bengal during the week under report, and the cold weather is reported to be setting in. Except in flooded tracts, the prospects of the late rice harvest are generally very good. In some places in Behar the want of rain is [illegible] *Rabi* cultivation is in active progress, and the [illegible] in promise well. In Assam prospects continue good. In British Burmah the crops promise well, except in Prome and Thayetmyo, where the rainfall has been insufficient. Fever is more or less prevalent in most provinces, otherwise the public health is fair. In Bengal the price of rice has fallen in almost all districts; and in Mysore and Coorg prices continue to fall. Elsewhere they are generally steady, except in the Punjab, where they are fluctuating, and in Rajpootana, where they are rising in some places.

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AN Americ[illegible]per of some authority, writing on the inferior quality of Am[illegible]an wheat says:

While it is an [illegible]mitted fact that our wheat crop is this season immensely short in quantity from that of last year, it is not so generally understood, we think, that there is a large additional loss by reason of the comparative inferiority in the weight and flouring qualities of the grain in a large number of States. In quantity as well as quality, probably the States of West Virginia, Tennessee, Kentucky, Kansas, Illinois, and Missouri are the greatest sufferers. In Kansas the result of the harvest is most deplorable, reliable advices reporting the average weight of the wheat over wide areas as not over 45 lbs. to the measured bushel. Such wheat is scarcely fit to make into flour, and at any rate would require a very unusual quantity to make a barrel of it. About 4½ to 4¾ bushels of 60 lbs. each of good plump No. 2 wheat is about what is generally used in our improved mills to turn out an excellent barrel of flour, but of such 'chicken feed' or 'stump tail' wheat as Kansas is reported to have gathered this season, it would very likely take 6 bushels or more to make a poor barrel of flour. The reports from the other States mentioned are not so bad, but they are poor enough to be very discouraging. Regarding the spring wheat crop, the accounts have for several weeks past been coming in poorer and poorer, both in respect to acreable yield and quality. Many fields are not thrashing out more than two-thirds to three-fourths the quantity anticipated, and the weight of much of the grain is very considerably less than the crop of last year. The more backward fields in Minnesota and Dakota were more or less injured by intense heat when the grain was in the milk, the temperature rising on several days to 118 deg. to 120 deg. Of course such intense heat at that critical time more or less shrivelled the berry, and prevented its subsequent growth and development. It is impossible, of course, to form any tangible estimate of the injury the crop as a whole has sustained in its quality from the adverse elements to which in numerous States it was subjected; but in average weight per bushel and flouring capacity, as compared with the crop of last year, the sum total undoubtedly forms a very serious item, amounting to many millions of bushels, and is a loss that is to be taken into account in estimating the result of the harvest just as much as the shortage of acreable yield in measured bushels.

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THE applicability of Rule 7, framed under section 26 of the Forest Act, has given rise to much discussion. It was not many months ago that we noticed an amendment of this rule. It has again come up, as the Madras Board of Revenue fear that some misapprehension may possibly exist regarding the scope of the Government Order issued in July last. They therefore think it advisable to explain that it is only intended to apply to those cases where it is contemplated to form reserves of reserved lands; and that in all such cases, prior to any proposals of such a kind being submitted to the Board, it is the intention of Government that the prescriptive rights of the villagers of the villages in which the proposed reserved lands may be situated, should be first of all carefully investigated and reasonable areas for the exercise of those rights be set aside before the reservation of the rest of the land proposed to be reserved is recommended to the Board. The Government of Madras, however, consider that the Board of Revenue are mistaken in supposing that the order of July 1883, is intended to apply only to those cases where it is contemplated to constitute "reserve lands." Under rule 10 the 'trees and timber' of unoccupied *unreserved* lands are vested in the Forest Department; consequently the application of rule 7 is necessary, even in villages where no "reserved lands" are proposed, for the protection of prescriptive privileges. Further, that the procedure prescribed by the Board seems suitable enough as a preliminary to reservations under rule 7. The Government consider that the inquiry will really be a kind of petty forest settlement, and it is right that it should be held by the Divisional Officer, the District Forest Officer being present, if necessary, to safe-guard the interests of the State; but that it is going too far to require an inquiry of this description in all cases where it is proposed to constitute "reserved lands." There is no necessary connection between rule 7 and reserved lands, and the two things should be dealt with separately. Tracts set apart as reserved lands can always be thrown open again, should it appear to be necessary to do so for the purposes of rule 7 or for other reasons. And, lastly, the Government of Madras observe that the Board's Proceedings, of June 1883, which should be read as modified by the order of July 1883, related only to fuel and fodder reserves, the place of which will, to a great extent, be supplied by reserves under rule 7 and reserved lands. The Board is therefore to again impress upon all Collectors the great importance attached by Government to the speedy carrying out of rule 7.

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A CORRESPONDENT sends the following regarding the Rohtuk Horse Show to a contemporary:—

> This Horse Show is of recent establishment, and of minor importance. Rohtak, though the head-quarters of a district, is one of those semi-exiled stations which no one visits who is not obliged to do so in the course of duty, and from which those, to whose lot appointments there may fall, lose no time in availing themselves of the first chance of a change of residence. It is a district in which there is but little waste land; it is largely cultivated, and "runs" for young stock are pretty well out of the question. The show was instituted some four or five years ago, with a view to stimulating horse-breeding in the district by the offer of prizes for successful exhibitors, and by affording breeders a market for the disposal of their young stock. As a market for remounts, it has never attracted more than one or two casual purchasers; and this year, though purchasers were present, no remounts were forthcoming. The early bird gets the worm, and as representatives of various regiments have been steadily buying in the district for the last three months, the pick of the local produce has mostly been disposed of. A little over 100 remounts have been purchased in the district since about last August. This no doubt affected the supply brought in to the Show for sale to a certain extent; but the amount given in prizes only amounts to Rs. 350; and though, under other circumstances, perhaps 20 to 30 remounts might have been procurable, the chances are that the remainder would not have come in here, but gone down to the bigger fair at Batesar. In fact, it seems quite an open question whether the site of this show might not, with advantage, be changed (say) to Delhi, and there combined with a show for cattle. Delhi would take a much larger area and catch, moreover, all the "strings" going down country; would be much more get-at-able for both exhibitors and purchasers, and should attract them in greater numbers than now patronise Rohtak. As far as this year's Show is concerned, the exhibition of brood stock was poor in quality, and very limited in numbers. As a market there were certainly above half-a-dozen animals in the place fit for remounts, two of which were purchased by the Remount Committee: the remainder presumably holding out for extravagant prices, which the owners hope to get elsewhere. The cattle and donkey shows are held at other places in the district, and it seems a pity they cannot all be combined. There was also the usual ploughing contests, the exhibition of antediluvian agricultural implements, which, however, no doubt answer all the requirements of the Jat cultivator—and that was about all.

THE Principal of the Agricultural College, and the acting Director of Agriculture, Madras, do not seem to agree as to the precise nature, extent, scope and control of the "annexe" to the College. Mr. Robertson, the Principal, gives it as his opinion that, "in the interests of the College farm," he should have control over certain land which is to be included in the 'annexe'; and further, that as he proposes giving considerable attention to dairy farming on the College farm, the [illegible] land might be set apart for grazing the cattle, the whole being laid down in grass. To this the Director demurs; as this in plan language means that the Principal of the Agricultural College proposes to carry on the Saidapet Farm *mutato nomine*, and to convert it from one for 'experimental' cultivation to one for experimental dairy-farming; and adds that this is not the intention of Government. He further "objects to having the Veterinary hospital hemmed in and surrounded by land in Mr. Robertson's charge," and goes on to say that "there were differences when the whole farm was in the hands of one and the same department, and the probability, now that portions of it will be under the control of two separate departments, is, that these will recur." This is unfortunate; as in a matter of public interest there ought not to be such differences. As far as we can see, Mr. Robertson has made out a strong case in favour of his proposal; for why should he not have control over ground attached to the College for instruction in dairy farming? And we fail to see anything objectionable in having the Veterinary hospital surrounded by land in Mr. Robertson's charge. We suspect there is some friction between Mr. Robertson and the Agricultural Department, which is clearly discernible in Mr. Price's concluding paragraph, which says:—"As for the exceptions which Mr. Robertson formerly raised to this plan, I do not think them worthy of discussion." The plan referred to is, the possibility of Government determining to use a considerable portion of the land in dispute for the erection of a reformatory. The Board of Revenue consider that the annexe to the Agricultural College should be strictly limited to the area of about 40 acres included within the limits marked, and that the Principal should have no interest in, or control over, any other part of the farm. And that his proposal to take up dairy-farming should be at once disallowed. Mr. Price's idea that the reformatory (if one is to be built) should be at the farm is one that strongly commends itself to the Board, with a view to the boys in the reformatory being taught agriculture on the experimental farm by Mr. Robertson, and being employed by him as gardeners or labourers on the farm. The Government of Madras have accepted the proposals of the Director and the Board as to what shall be the extent and limits of the farm-annexe to be attached to the School of Agriculture, and have decided that the precise scope of the operations to be conducted thereon will be determined in the Educational Department. They note, however, that the expression "experimental farm" is inaccurate, the annexe being intended for practical *demonstrations* only, and not for experiments.

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"WARAS" is the name of an Arabian drug or dye stuff, the plant producing which has been identified as occurring in Southern India. This has formed the subject of a correspondence between the Madras Government and the Secretary of State for India, with the object of ascertaining its value as a dye. An experiment was accordingly carried out by Mr. Thomas Wardle, the well-known silk dyer of Leek, Staffordshire, in communication with Mr. Thiselton Dyer. The latter in forwarding Mr. Wardle's report to the India Office observes that the illustrative specimens so admirably prepared by Mr. Wardle should, in Sir Joseph Hooker's opinion, be sent to India to be deposited in the Central Museum, Madras. Further, that Sir J. Hooker thinks that, the China silk dyed with "Waras" by Mr. Wardle, show great delicacy of tint; and he does not see why the dye, the use of which in India from an indigenous source appears to have been previously known, should not have at least a local value. Mr. Wardle's report, dated 14th July, 1885, addressed to Mr. Thiselton Dyer, runs as follows:—

> In reply to your letter, dated 27th February, asking me to examine the sample of "Waras" which accompanied it with regard to its

properties as a dye, I beg to state that I have so examined it, and I send you herewith a few specimens of mulberry silk tassar silk and wool which I have dyed with it. This substance contains only a small amount of coloring matter compared with the vegetable yellow dye of commerce, and no colors can be obtained from it which will bear comparison in depth and richness with those produced from Kamila or Kapila, which, it is stated in the Kew Report for 1880, it is used as a sub[illegible] and which is certainly a very much more valuable dye stuff. As far [illegible] my observations have gone, Waras is inferior to Kamila in permanence, as regards the action of light. Below is a specimen of the dyed fabric which accompanied your letter of 27th February, which has been exposed to light for three months, compared with a specimen which has not been so exposed. The color produced by Waras is easily turned brown by alkaline solutions, whilst Kamila is only slightly reddened. Both dyes, however, resist the action of acids very well. It probably would be well, if possible, to get another and larger sample of Waras and make further experiments, especially as Professor Lawson intimates that the sample sent has been damaged owing to the excessive wetness of the season.

I corroborate the statement of Professor Lawson that Waras is suitable for a dye for silk rather than for wool, and that it is useless as a dye for cotton. I have tried it on cotton with most of my mordants, as well as without mordants, and the result is only a very pale shade of yellow. I send you four cards containing trials made with the dye stuff:—

No. 1 contains nine specimens of Corah silk (mulberry silk) cloth dyed with Waras—

3 specimens, R process. }
3 „ A „ } methods of application of my own.
3 „ G „ }

No. 2 contains nine specimens of tassar silk dyed with Waras—

3 specimens, R process. }
3 „ A „ } methods of application of my own.
3 „ G „ }

No. 3 contains nine specimens of wool dyed with Waras—

3 specimens, R process. }
3 „ A „ }
2 „ I „ } methods of application of my own.
1 „ G „ }

No. 4 contains seven specimens of mulberry silk dyed with Waras and Waras mixed with other dyes (aniline)—

3 specimens Waras alone.
4 do do, mixed with other dyes (aniline)

Also a specimen of organzine, for comparison, dyed with Kamila or Kapila (*Mallotus Phillipensis*). It has been decided to send another larger sample of the dye for further experiments.

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THE first annual report of Mr. OZANNE, the Director of Agriculture in Bombay, is very favourably reviewed by the Governor of Bombay, who is of opinion that, considering the short time during which Mr. OZANNE has been in charge of the Agricultural Department, the ground traversed by the report is sufficiently wide, and proves the great interest he has taken in all subjects connected with his department. The principal objects for the establishment of an Agricultural Department namely, to place under skilled, central, and systematic direction desultory, fragmentary, and unscientific experiments, to maintain a trustworthy record of such experiments and observations, to aid and encourage higher cultivation, to bring the produce in contact with the exporter, and to furnish agricultural facts and statistics, serviceable alike to the Government and the trading community, have been very correctly realised by Mr. OZANNE, who during the short time he has been Director of Agriculture in Bombay, has succeeded in "introducing into the Dharwar district a new staff of revenue inspectors who supervise village accounts as well as collect agricultural statistics." If the system works well in Dharwar, it is intended to extend it gradually to other districts. Among other works which Mr. OZANNE did during the year (1883-84) was the useful note which he wrote on the use of rab. Mr. OZANNE'S investigations in this direction confirms the opinion held by the natives, that rab is used expressly for the purpose of roasting the soil, with the view of destroying the germs of vegetation likely to prove destructive to young plants, than for manuring it. On the subject of the working of experimental farms, the Director has made a few remarks, which the Governor of Bombay commends to the notice of the Superintendents of the Experimental Farms at Hyderabad in Sind, and at Bhadgaon in Khandeish. Among the more important directions are that all experimental plots should be duplicate, and not triplicate. Each series of experiments should comprise an exemplar plot in duplicate which is necessary for the sake of comparison. "Thus if a particular plot is being tested, the exemplar plot will contain the chief crop of the rotation alone and year by year, in order that the effect of the rotation of that crop may be estimated at its true worth." The farm should be divided into a purely experimental and a general portion. The area in the experimental portion, though small at first, should be expanded gradually. As everything depends on the success of the experiments, it is suggested that these, "to be productive of reliable results, should extend over a number of years, and that the regularity of the plots is of the first importance to ensure a proper comparison of the results of one year with that of former years." In connection with this subject, it is said that "a further experiment in the curing of tobacco in Kaira is in contemplation, and the Government of Bombay have consented to bear a large share of the cost for another year." During the year, Mr. OZANNE devoted special attention to the subject of ensilage, important experiments in which were conducted at Kirkee with the assistance of Lieutenant-Colonel CALDECOTT, R.A. The results are considered to be satisfactory, and a hope is expressed that the Commissariat Department and the contractors, seeing the value of it, will soon commence to use it for their cattle.

THE EFFECTS OF TEA-DRINKING.

THIS is an old subject, and has been so threshed out, that one might have thought there was no phase of the question left untouched. The *pros* and *cons* have been argued from every point of view, and by all sorts and conditions of men. Yet, in the search for fresh topics to descant upon, "an old friend with a new face" has been overhauled. Even the pages of a novel have afforded an esteemed contemporary a theme for a scientific dissertation on the alarming effects of tea-drinking. If by attracting prominent attention to a matter affecting a vast community, it is intended thereby to lessen the evils resulting from an over-indulgence in a beverage which has been aptly termed "the cup that cheers but not inebriates," then we say that it is only right and proper that erring mortals should be set right; but even then we are of opinion that it is well not to draw the bow too long. But let us see what our contemporary, the *Madras Mail*, has to say on the subject. The paragraph that has inspired the article under reference, occurs in the 25th chapter of a novel now appearing in the *Cornhill Magazine*, entitled "Court Royal." The steward of the owner of "Court Royal" is made to address his son, Beavis, as follows, one morning at breakfast:—

> "I never take tea with meat. No tea, Beavis; coffee for me; less tannin in it. Can you conceive anything more calculated to give dyspepsia than to immerse meat in a fluid charged with tannin? You convert it at one stroke into leather, and make demands on the gastric juice which it is not qualified to perform. No, tea is poison; give me coffee." * * * "But mind, Beavis, remember what I have said about drinking tea with meat. You deliberately tan your food, and yet you expect to digest it. As well eat sole-leather."

Although our contemporary's comments are somewhat lengthy, it is desirable to quote them *in extenso* for a proper understanding of the line of argument taken. This is what he says:—

> To say the least this is disquieting, for although it appears in a work of fiction, it refers to a matter of fact. No one denies that a hot infusion of coffee, or tea, is invigorating, and useful in fatigued states of the system, and preferable generally to alcoholic drinks. The late Dr. Parkes says in his standard work on Hygiene, that "coffee and tea have a stimulative and restorative action on the nervous system, which is perhaps aided by the warmth of the infusion," while the action of the skin which is induced is also useful. This has been the experience of many of our late campaigns. Tea and coffee are equally serviceable, and acceptable in all climates, and if drunk in moderation, they leave no after depression. The active principles of tea and coffee, theine and caffein are chemically and physiologically identical, but tea contains what coffee does not, namely, tannin, and it is chiefly due to

> this constituent of tea that certain evil effects are observed to arise from immoderate tea-drinking. Tannic acid, or tannin (so called "because it is the ingredient which in oak bark is generally employed for the tanning of leather"), besides acting as an astringent, precipitates, or unites with albumen, and in this way forms an insoluble substance with the albuminous matters of food in the stomach. Such matters are thus rendered less soluble and easy of digestion. Tannic acid lessens the secretions of the stomach, and diminishes the solvent powers of the gastric juice. Hence it is inadvisable to take substances containing tannin close to meal times; and experience teaches that tea at heavy meals is not so good as coffee. Tea itself is consequently productive of dyspepsia (especially of flatulent dyspepsia), and a continuation of the habit of drinking large quantities of tea simply aggravates the disease. This form of dyspepsia is probably rife in Russia where the samovar, or tea urn, is always on tap, alike in palaces and in hovels. Dr. Richardson in his "Diseases of Modern Life" describes the symptoms which indicate the injurious action of tea. They are severe headaches, constipation, flatulency, muscular feebleness, and "lowness of spirits amounting to hypochondriacal despondency." This lowness of spirits under the influence of tea is very marked in children, and an "extremely nervous, semi-hysterical condition from the action of tea, is all but universal in poverty-stricken districts in England amongst the women who take tea at every meal." Nervous symptoms have been much developed in the richer classes of society, in London and other fashionable centres, since the revival of the custom of tea-drinking in the afternoon, and escape from the wretched feeling which is thus engendered is too often sought by recourse to alcoholic "pick-me-ups."

In fact the inference to be drawn from the foregoing is that, like everything else, an undue indulgence in the use of tea, is certain to be followed by injurious effects, calculated in a greater or less degree to derange the assimilative organs of the body. How far these arguments are borne out by ascertained facts, we shall examine further on. The *Madras Mail* goes on to say that—

> There is reason, however, to suppose that a large number of people imagine that tea is perfectly innocuous, that the only thing to be guarded against in its use is the avoidance of drinking it in the evening, since it tends to cause wakefulness. Hence, there are among us people who are immoderate drinkers of tea, and confirmed dyspeptics. Dr. Johnson used to drink tea not out of cups, but out of basins, and he was at times the most morose and irritable of men. One cannot be immoderate in anything without having to pay a penalty.
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> To anybody with comparatively sluggish digestive powers, the imbibing of a copious quantity of any liquid must in the nature of things be deleterious. The digestion and assimilation of food cannot go on properly if one pours bucketful of tea, or even water, down the much enduring Red Lane. Anything that can be proved to hinder digestion, or to cause indigestion should be avoided, no matter how seductive it may have become by long habit and old association. It is practically impossible to do oneself justice, or to take reasonable views of life, while one is a martyr to "the blues." Indigestion, when it becomes habitual, throws a glamour over and tends to embitter and shorten life. The victims of it usually resort to medicine, and forget the need of considering their diet. They obtain temporary relief, but the demon is not exorcised, he is merely taking a little holiday, and he speedily makes his presence felt again. English people now drink nearly five times as much tea as coffee, the proportion being 4·62 lbs. to 0·89 lbs. Forty years ago, or in 1845, they drank but little more tea than coffee, the proportion being 1·59 lbs. to 1·23 lbs. respectively. In this country Europeans (especially the weaker vessels) often drink more tea than is good for them. They take it at *chota hazree*, or immediately upon waking; at breakfast; and in the afternoon; and they hardly ever touch coffee, though it is indigenous to the country. And natives too, when they get the chance, develop a great avidity for tea. It is computed that about three-fourths of the human race drink tea, coffee, chicory, or cocoa.
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> * * * * * * *
>
> In a word, beware of the latent property in tea that is capable of converting your interior into the similitude of a tannery. "There is nothing like leather," remarked a philosopher in the trade; but it is just as well not to tan one's food so as to make it as hard of digestion as sole leather.

The foregoing remarks appeared in an issue of our contemporary last month; and we thought, when reading them, that a very important factor had been lost sight of. It is pretty well known that the nourishing and invigorating properties of tea are due to the presence of theine, which is the active principle and that in preparing the beverage, care should be taken not to allow the leaves to infuse too long, as then tannic acid, which is largely present in tea, is extracted, and this substance it is that acts prejudically on the digestive organs, by uniting with the albumen contained not only in the milk, but [illegible] other albuminous matters of food in the stomach, thus forming a compound bearing an analogous resemblance to leather, which is far from being easily digestible. And when we consider the *intemperate* use of tea in conjunction with its mistaken preparation as a beverage, it is not surprising that dyspepsia and its attendant evils should be the result. We, however, refrained from referring to the subject, as we considered that probably these simple facts were generally known. In a recent issue of the same paper (*Madras Mail*) a correspondent from the Nilgiris, signing himself "One of Them," replies to the article we have been quoting; and as the facts and arguments advanced by the writer are entirely in accord with our own knowledge of the subject, we reproduce the letter below for the benefit of our readers:—

> With reference to an article in your issue of the 23rd instant, anent the horrors of a cup of tea, will you kindly allow me, in the interests of the large community of tea planters as well as of the public, to offer a few remarks thereon? If the stomachs of the tea drinkers are destroyed by tannic acid, they may comfort themselves with the reflection that it is entirely their own fault! This may seem a sweeping assertion to make, but I will shew that such is really the case. Every one, I suppose, is aware that the nourishing, refreshing property of tea is the theine, and also that the tea leaf yields up the same theine more quickly than the bug-bear tannic acid; consequently the avoidance of the injurious effect of tea is manifestly easily effected. Infuse your tea leaf such length of time as will extract all the beneficial properties of the leaf, but will not extract the tannic acid. There has been a great conflict of opinion amongst authorities as to what length of time is necessary. Some say five minutes and others ten minutes. I can only quote my own experience, however. I am accustomed not only to drink my cup of tea regularly, but also to test teas. Provided the water used be at the boiling point when poured over the *leaf*, I detect the presence of tannic acid at once, if the tea is not poured out in three minutes' time. What must be the nature of the brew in ten minutes' time! And what in twenty minutes'!! And yet there is generally no care observed as to length of infusing tea. Some time ago, at the house of a friend, I drank a cup of tea which was so much better than that generally met with, that I ventured to take the liberty to make enquiries. My hostess replied, "Oh! I always make the tea with my own hands, and would never think of leaving it to servants." The moral is obvious. If, then, tea be infused for exactly three minutes, the resulting fraction of tannic acid present will be so exceedingly insignificant as to be quite inappreciable. Allow me to correct an error in the same article under discussion: coffee does contain tannic acid, but less than half the proportion in tea. Should any nervous reader still feel shy of tea, in spite of the above remarks, let me add, for that same individual's peace of mind, that in hill or mountain grown tea, the percentage of tannic acid decreases in quantity with the increasing elevation at which it was grown, and a correspondingly larger proportion of theine takes its place. This is the reason of hill and mountain grown teas tasting weaker than tea grown at low elevations, which latter contains more tannic acid. But unfortunately, the larger the proportion of tannic acid, the more the general public appreciates the same. Until people are better instructed regarding the properties of tea, such must still remain the case. The statements put forth in papers in England are simply ludicrous. For instance, a short time ago the question was mooted whether that splendid Mandarin tea which never crossed the boundaries of China, and was of such remarkable strength that two small leaves sufficed to make a cup of tea (! !) could not be procured for consumption in England. In a recent prospectus of a new tea company in London, the public are warned that four crops of tea are gathered during the year, and that the first crop contains the largest proportion of theine, whilst the last crop scarcely contains any! The finishing touch to this remarkable statement is given in the flourishing certificate of an F. C. S. and F. R. M. S., who duly certifies that the "aroma" of this too wonderful tea is pungent!!
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> *Resumé*—Never allow tea to soak longer than three minutes, the utmost, five minutes. See that the water is at boiling point before infusing the leaf. Avoid the use of boiled or warmed

milk in tea. Limit the consumption to the average of three cups a day, viz., morning, afternoon, and evening. If these simple directions are observed, there is no fear of tea having any injurious effects, nor of anybody's stomach being turned into a miniature tannery.

MYRABOLANS.

The development of this industry in India is of comparatively recent date. It is not because it did not exist in an indigenous state in the country, but because, like most other industries, it wanted an impetus given to it, or we should say a demand created. The trees which yield the myrabolans (*sometimes erroneously written myrabolams*) of commerce belong to the natural order Combretaceæ, and are of two varieties, *viz.*, the *Terminalia Chebula* and *Terminalia Belerica.* The entire genus is known as the myrabolan order, and all the species are natives of tropical regions. No less than 12 varieties are to be found in India. The two we have named above, yield the myrabolans of commerce. The bark and leaves of another species (*Terminalia Catappa*) yield a black pigment from which Indian ink is made. A milky juice is said to flow from *Terminalia angustifolia*, which when dried is fragrant, resembling benzoin (hence its synonym, *T. Benzoin*) and is used as a kind of incense in the churches in the Mauritius. The dried milk is sold in the Indian bazaars, and sometimes takes the place of gum-resin. The *Terminalia Catappa* also yields a kernel, very similar in appearance and flavor to the common almond, and is sold in the Calcutta markets under the name of *desi badam.* The genus is widely distributed all over India, but is found growing in great luxuriance in the N.-W. Provinces, Bengal, the Central Provinces, and Madras. Any soil that is clayey, or even a sandy loam, suits it.

With the foregoing preface we shall consider what progress the trade in myrabolans has made of late years. In the report in the railway-borne traffic of the Central Provinces for 1884-85, *it is stated that during this year, myrabolans were separately* registered for the first time. *The exports in the previous year* were *nil*, but amounted during 1884-85 to 2,24,193 maunds, valued at Rs. 5,74,495. Of course, they formed part of the export trade in previous years, but the amount must have been inconsiderable, and we suppose they came under some general or miscellaneous head. The trees from which these myrabolans were produced are called in the Central Provinces "harra" and "bahera;" and the Director of Agriculture states that they are found growing abundantly in many parts of the provinces, and promise to become a most productive source of forest income. That the export is at present principally derived from the Satpura forests in the Jubbulpore and Nerbudda Divisions, while the Chuttisgarh forests only contribute a quarter of the quantity exported. He adds that the extension of the Chuttisgarh Railway towards Calcutta will bring into the market very great supplies of myrabolans, which are now wasted in the jungles of Raipore, Sumbulpore, and the Native States surrounding them. Attention has recently been called to the great production of this fruit in the Sumbulpore district, and it has been pointed out that large profits would accrue to the Government forest could export trade in myrabolans be established. Bearing this last fact in mind, it would be interesting to learn whether any protective measures have been set on foot in the Central Provinces to preserve the trees yielding this product from wanton destruction, for it must be remembered that the bark and leaves possess astringent properties, and it has been brought to notice in the Madras Presidency that trees are felled wantonly for the sake of the bark, leaves, and fruit.

With reference to the Madras Presidency, we have before us the report of Mr. J. S. Gamble, the Conservator of Forests, northern division, Madras, of March 1885, in which he submitted certain proposals for the conservation of myrabolan trees and the development of the industry generally. His proposals briefly were that all tracts on which the myrabolans, grow including other valuable forest trees, should be placed under the Forest Act, with simple rules for management of definite areas of reserved forest. After the settlement of preliminaries, he recommended the collection of myrabolans departmentally by employing hill-men as collectors, and paying them at a percentage on the market value to be fixed yearly for the season in which they are ripe. So far therefore as Madras is concerned, the myrabolans form a Government monopoly. And although this may not be the best plan for developing the industry, yet it is, for the present at least, the only one whereby the trees can be best protected from destruction and denudation. The *Terminalias* are very common in Bengal, and may be seen planted along roadsides, where they form fine umbrageous trees. We are not aware, however, whether the produce of the trees forms any part of the export trade: we should think not, for we have not seen mention made of them in the usual trade reports. With regard to the N.-W. Provinces, where these trees grow in great luxuriance, we have no information as to the trade in myrabolans; but that it is capable of being developed, there can be little reason to doubt. In the Punjab, only solitary specimens are to be met with here and there, but we should think that in the Western Presidency there must be large forest tracts of *Terminalias*, yielding large quantities of myrabolans. If properly worked, this industry is capable of yielding a very respectable revenue. We have here endeavoured to place before our readers a few facts concerning the myrabolan trade, which promises to assume large proportions at no distant date.

Miscellaneous Items

Mr. Burgess, Archæologist to the Governments of Bombay and Madras, has just returned to India after an absence of eighteen months. He proceeds to Guzerat to resume his investigations.

According to the *Timber World*, the loss to the United States through forest fires is now not less than 300,000,000 dollars a year, a sum equal to the interest on the public debts of all the civilized nations of the world, through the carelessnesses of boys and hunters. Locomotives should use spark-arresters during the dry season, and underbrush from the woodland ought to be systematically removed.

The petrified human eyes from Peru, which are mentioned as the latest Transatlantic ornament, seem rather dangerous novelties. Several workmen engaged in cutting and setting the eyeballs have been taken seriously ill, affected, it is believed, by the strong acids and poisons used in embalming the Incas, to whose bodies the eyes belonged. To fit the eyeball for use it is cut into four or five layers, which are well polished. The eye is as soft as an onion, and resembles irridescent glass.

The prospects of the *kharif* crops in the N.-W.P. are as follows:—Cotton and maize are good, and will yield not less than three-fourths of a full crop; *bajra* and *til* about the average, and pulses rather above it. *Juar* bad, and the late sown, very bad. Rice, early sown, will yield above the average, except the very earliest, which rotted from the August rains. The late sown rice felt the want of rain in October, but is mostly planted in districts where it can be helped by artificial irrigation. In fine, there is little to complain of, and much to be thankful for.

The experimental installation of the electric light at the Madras Club has now been extended as far as the power of the machine will admit, and embrace the most important rooms in the building. The current is generated by an Edison dynamo-machine, driven at a speed of 1,200 revolutions a minute by one of Marshall and Co.'s engines hired from the Public Works Department for the experiment. There are three "circuits" or pairs of wires, conveying the current from the dynamo-machine to the house, each of which can be turned on or off at will by the attendant in the machine room. The largest of these circuits, which conveys the current to the reading room, bar, dining rooms, and passages is divided into a number of small sections, each consisting of six, nine, or twelve lamps; any one section being extinguishable at will. Again each lamp is fitted with a tap like a gas jet, and may be lit or put out when required. Lamps of sixteen-candle and ten-candle power are used, the latter being suitable for the passages, where much light is not wanted.

Mr. Havell, the Superintendent of the Madras School of Art, has received instructions to make a tour, in his capacity as "Art Reporter," in the Northern districts of the Presidency, similar to that made by him last year in the South, with the object of reporting upon the art industries of these districts and selecting specimens, for exhibition at the local School of Arts. The sum of Rs. [illegible]0 has been allotted for the purchase of specimens and Mr. Havell will start shortly on his tour, Captain Tufnell, the Adjutant of the Madras Volunteer Guards, being his *locum tenens* as on the former occasion.

An addition which has recently made to Bombay local industries claims attention less for its intrinsic interest than as an illustration, of what may be done in the way of supplying the necessities of the country from its own manufacturing resources. A Bombay medical man, who would never have taken to match-making except in order to show his countrymen that they can produce in their midst commodities for which they have hitherto sent to the ends of the earth, has for a long time past patiently expended time, and thought, and money in the endeavour to establish in Bombay a match factory from which matches as good as those which we now import from Sweden, Belgium, and elsewhere in Europe can be turned out. The experiment, we believe, can already be spoken of as a commercial success. For some weeks past Bombay-made matches have been on the market—matches equal in all respects except perhaps neatness and finish—to the Swedish article, and they are sold at a fair profit for fourteen annas a gross or two boxes for a pie. The chemicals are of Indian origin, and the whole process of manufacture, including the making of the boxes, is carried on in the Bombay factory. The wood is the only imported material, but it is cut up here, and it is hoped that a wood equally adaptable for match manufacture with European pine may be found in the Indian forests.

Selections.

THE SOIL OF THE FARM.

BY W. D. BOYNTON.

The intelligent man in buying a farm first satisfies himself as to the quality and capacity of the soil. It is a matter of vital importance to himself and family. From the soil their subsistence must be gained. Here, if he so cast his lot, must be invested the accumulated earnings, the wealth of mind, and strength of body, with which he has been endowed. It is little to be wondered that his first thought is for the soil in which he invests his all, and from which he should receive so much

While those who are just locating on land can, to a measurable degree, select the soil that they deem best adapted to the branches of farming they wish to pursue, those who are already established upon farms, must learn to make the most of the soils upon which they are placed. It is a very poor soil that does not possess some quality that makes it superior to other soils for certain purposes. If this truth were more generally appreciated among farmers, there would be less dissatisfaction and moving about. The farmer on the light hilly soils of the north eastern states, is prone to sigh for the fertile prairies of the west. He knows that they who till the western lands, can pour the golden wheat down at his very door for a smaller price, that he can profitably produce it. He feels that he cannot successfully compete with them, and in that he is right. But he can do better. He can produce that to which his soil is better adapted, and which his proximity to large markets will make profitable.

In buying land for farming purposes, the purchaser is very likely to select the most fertile, if it be within his reach. Usually his first question will be, "How much wheat will it yield to the acre?" When he has satisfied himself that it is a good wheat soil, he is quite ready to purchase without much further inquiry as to other qualities and conditions. To be sure a good wheat soil will often produce other crops most satisfactorily; but as there are many good wheat soils that are not at all favorable for mixed farming, the wheat-producing power of the soil should not entirely govern one in his estimate of the value of land. The farmer should bear in mind, too, that wheat-growing followed continuously and exclusively, will soon exhaust even the strongest soils. The continued growing of any crop that is not fed out on the farm, must sooner or later impoverish the soil.

Before going further, we will briefly consider the character of the different soils, and the proper treatment of each. As it is not within the scope of this work to go into minute divisions and sub-divisions, only those soils with which the farmer has to practically deal, will be treated upon.

CLAY SOILS.

The clay soil, or soils, deserve, perhaps, first consideration. Clay is found in varying quantities in nearly all soils, while in the clay soils proper it is, of course, the principal constituent. Clay predominates in our strongest and best soils. The pure clay soil is sometimes found, but is not desirable for agriculture. Clay is an excellent ingredient in soils, even in very large quantities, but without the modifying effect of sand and loam it can hardly be handled by ordinary methods of cultivating.

By judicious management a soil that contains large quantities of clay, or what would be called a strong clay soil may be made to produce the very best results. Strong clay soil contains but little vegetable mould. The particles of clay are very fine and compact, and form an almost impervious soil. The addition of water unites these particles still more closely, forming a plastic compound. During a drought, or even in ordinary dry weather such a soil will bake and crack open in seams and fissures times two or three inches in width. To remedy this the water must be drawn off as quickly as possible—a work best accomplished by under-draining. Surface or open drainage will partly answer, but is decidedly inferior. Where under drains are used the water sinks down through the soil, leaving little open pores for the entrance of air, and the soil at the same time retaining sufficient moisture for its needs.

Clay is perhaps the most difficult of all soils to work. If cultivated when too wet, it becomes lumpy and hard when dry. If ploughed when very dry a considerable power is needed, and then the work is poorly performed. For this reason, if for no other, clay lands should be thoroughly under-drained that they may be kept in proper condition to work at nearly all seasons.

Clay, more than any other soil, needs the pulverizing action of the frost. In order to give the frost a good chance the ploughing must be done in autumn, that the upturned surface of the furrows may be thoroughly exposed through the winter. Frost is a great disintegrating power. It is inexpensive and works alike for all.

Clay soils should not be rolled or pressed as the already too great tendency to compactness will be increased thereby. If properly handled, the soil will not become so lumpy as to render the use of the roller necessary. Fine toothed harrows and cultivators are prime necessities in handling such soils. Coarse green crops are also highly beneficial when ploughed under on such soils, as they tend to separate the masses of compact earth. Coarse manures of any description act in the same manner. Clays are rich in inorganic elements of plant food, and have a wonderful power of retaining any organic manure applied to them. They also draw heavily from the atmosphere. Clays taken from far below the earth's surface, where it was impossible for them to become fertilized with organic manures when exposed to the air and moisture for a time, have been known to grow and mature heavy crops of vegetation.

A clay soil with a large admixture of loam, or what is commonly known as a clay loam, is much more desirable for agricultural purposes than a strong clay soil. Such a soil is much less compact and consequently more easily worked than the pure or even strong clay. It contains considerable sand and vegetable matter that greatly increases the warmth and dryness Clay-loam is also suited to a greater variety of crops than the strong clay. It should, however, be treated in substantially the same manner as that given above for strong clay soil.—*Farmers' Review.*

LIST OF AWARDS MADE TO EXHIBITORS IN THE BOMBAY SECTION OF THE ANTWERP EXHIBITION.

Section I. Group I. Class 4 Printing and Books.—Silver medal to the Government of Bombay (Book Depot) for printing and books.

Group I. Class 6. General application of the Art of Drawing and Modelling:—Silver medal to Zoo[illegible]kur Khan for Delhi paintings. Silver medal to Framjee Pestonjee Bhamgara for Poona figures, &c. Bronze medal to Govind Wishwonath Dongri for Poona figures, &c.

Group I. Class 8 Musical Instruments.—Bronze medal to the Government of Bombay.

Group I. Class 11. Maps and Geographical Apparatus.—Silver medal to the Government of Bombay.

Group II. Class 12. Cheap and Fancy Furniture.—Silver medal to Mulchand Bhai Hattesing for carved work. Silver medal to Framjee Pestonjee Bhamgara. Bronze medal to Santaya Bin Sadhaya for carved work. Bronze medal to Ganpate Bin Govind Shetti for carved work. Honourable mention to Purshotum Khushal Dhalgar for carved work. Honourable mention, Sorabjee Jamasjee Billimoria for carved furniture. Honourable mention, Jamsetjee Shapurjee for carved furniture. Honourable mention, Moti Kuber for carved furniture. Honourable mention, Jamsetjee Nowrojee for carved furniture.

Group II. Class 15. Pottery.—Bronze medal to Government of Bombay. Bronze medal to G. W. Terry, Esq. Honourable mention to H. H. the Gaekwar of Baroda.

Group II. Class 16. Carpets, Tapestry, &c.—Gold medal to Supdt. of Yerroda Jail; silver medal ditto Agra do; silver medal ditto Ajmere do.; bronze medal ditto Hazaribagh do.; bronze medal ditto Bhagalpore do.; Honourable mention ditto Hyderabad (Sind) do.; ditto Lucknow do.; ditto to Dosabhoy Merwanjee and Co., ditto to H. H. the Nawab of Cambay.

Group II. Class 19 Gold and Silver Smiths' Works.—Silver medal to Framjee Pestonjee Bhamgara. Honourable mention to the Government of Bombay. Honourable mention to Messrs. Cursetjee and Sons of Ahmednuggur. Honorable mention to H. H. Rao of Kutch.

Group II. Class 23 Perfumery.—Honourable mention to Messrs. Bana and Co., Nausari. Honourable mention to Sorabjee Jamasjee Billimoria.

Group II. Class 24. Leather Work, Fancy Articles, &c.—Silver medal to Government of Bombay for horn articles, &c.

Group III. Class 25. Cotton Threads and Fabrics. Bronze medal to the Government of Bombay; ditto ditto Rao of Kutch; ditto ditto T. D. Experance; ditto N[illegible] Zumuck Shaw and Co.; Honourable mention to Dyan Chand Shaw; ditto ditto Thakur Pershad Shaw and Co.; ditto ditto Kaiser-i-Hind Spinning and

Weaving Co. Honourable mention to Anglo-Indian Spinning and Weaving Co. Honourable mention to Great Eastern Spinning and Weaving Co.

GROUP III. Class 26. Threads and Fabrics of Hemp.—Honourable mention to Superintendent of Central Jail, Lucknow.

GROUP III. Class 29. Silk and Silk Fabrics.—Gold medal to Government of Bombay. Silver medal to Sassoon and Alliance Spinning and Weaving Company. Silver medal to Vrijbhukhundass [illegible]. Bronze medal to Mohan Khemchand; ditto to Eknath Khemchand; ditto to Kalyanchand Lallchand; ditto to F. P. Bhamgara. Honourable mention to Zoomuck Shaw and Co; ditto Thakur Pershad Shaw and Co.

GROUP III. Class 23. Clothing of both Sexes.—Bronze medal to the Government of Bombay. Honourable mention to H. H. the Nawab of Cambay.

GROUP III. Class 34. Jewellery and Precious Stones. Bronze medal to Framjee Pestonjee Bhamgara. Bronze medal to Cursetjee and Sons.

GROUP III. Class 37. Toys.—Silver medal to F. P. Bhamgara.

GROUP IV. Class 41. Agricultural Products not used for food.—Gold medal to Chamber of Commerce, Bombay, for raw cottons. Silver medal to Anglo-Indian Spinning Company for raw cottons. Silver medal to Pestonjee Bomanjee Dantra. Honourable mention to Goverment of Bombay.

GROUP VI. Class 63. Cereals, &c.—Silver medal to Ahmednagar Agricultural Society. Bronze medal to Chamber of Commerce, Bombay.

GROUP VI. Class 68. Condiments and Stimulants.—Silver medal to Framjee Nowrojee; ditto to Rustomjee Bhikajee: bronze medal to Cursetjee and Sons for pickles. Honorable mention to Framjee Nowrojee; ditto to Rustomjee Bhikajee and Co; ditto to Cursetjee & Sons for Jams.

GROUP IX. Class 79. Bibliography.—Gold medal to Bombay Government.

T. WADDINGTON, Major-General,

By order of his Excellency the Right Honorable the Governor in Council,

J. NUGENT, Secretary to Government.

A PARADISE OF FRUIT.

THE eye of a stranger strolling through the roomy market-places of San Francisco is attracted at once to the fruit stalls laden with all the varied fruits that may be found in the temperate and even warmer latitudes of the world. From early spring to late autumn the same tempting pile in varied forms may be seen, and seen, moreover, with the comforting reflection that the modest sum of five cents (2½d.), the smallest current coin of California, will purchase more of the luscious wares than can be comfortably eaten at a sitting. In this very month will be found the peach in all its many kinds, large and small, cling stone and free; pears of every hue and shape; figs purple and white; golden apricots, plums, apples, strawberries, raspberries blackberries, currants &c., &c.; oranges, lemons, limes, bananas, and prickly pears; luscious grapes, red and white, in huge tempting clusters: persimmons of Japan, loquats of China—there they lie in profusion. No tender hothouse fruits wrapped carefully in pink tissue paper and softly lodged on cotton wool, but sturdy, ruddy, fruit, grown under the fair open sky and incessant sunshine of this favoured climate. Let our wanderer taste one of those great golden-hued Bartlett pears; its juicy pulps meets in the mouth—five pence will buy a dozen such; or invest five cents in that large bunch of purple grapes well over a pound in weight. Such a cluster would cost ten shillings in London. Those giant peaches may be bought at thirty or forty cents for a basket of some three dozen, and they will prove ripe and juicy. There is a Canteloupe melon as big as your head for fifteen cents, and a smooth green water-melon, much bigger, for the same price.

Let us stroll out into the busy streets. Here is an old fellow driving a brisk trade in five cent plates of fruit arranged temptingly along his stall. You may take your choice. There is a plate of three fine pears elbowing the counter-attractions of three lovely bunches of grapes, black, red, and white, a pyramid of peaches, another of plums, a dish of varied fruits, all ripe, fine, and luscious. At every street corner the small vendor is to be found with his five-cent plates, and in every street one or more fruit shops. Where is all this fruit grown? In all parts of the State; the wide alluvial plains, the warm, sheltered canyons, and the sunny slopes of the hills, all have their orchards and their vineyards, from which peep the pretty and comfortable houses of the fruit growers. Tons upon tons are shipped East to supply the New York and other markets; other tons are canned, bottled, and made into jams and jellies for distribution to the markets of the world; other tons again are dried and pressed. California has already a reputation for "canned" fruits, and is gaining experience and skill in the manufacture of dried prunes, raisins, figs, and such like, once the monopoly of the Mediterranean countries.

The wine makers too, are adding each year to their skill and experience. Thousands of acres are now planted with vines of the nobler sorts, and while the already excellent and cheap claret made from the Zinfandel grape is growing better each year, the epicure will, it is hoped, soon find in the California market wines of as delicate bouquet as those which are becoming so rare and costly in Europe. Fruit-growing in California is no longer so profitable as it has been. Like all profitable enterprises, it has been overrun by speculators, who have recklessly planted thousands of acres of trees and vines which are now coming into bearing, and glutting the market with their produce. The probable losses to many growers, and consequent re-action which must result in the near future, and are, indeed, already making themselves felt, will do much to restore the balance, and leave to the legitimate fruit-grower the steady profits of a pleasant calling.—*Pall Mall Gazette.*

MILK FEVER, OR PARTURIENT APOPLEXY.

THE following bulletin by the Professor of Veterinary Science in in the Michigan State Agricultural College treats of a subject of importance to every owner of cows, and the treatment described is worthy of trial by any one who finds one of his cows suffering from an attack of the disease. The treatment commends itself by its simplicity and the ease with which it can be used under almost all conditions:—

In compliance with section 2, of an Act passed by the legislature recently adjourned, providing for the dissemination of information gathered by certain departments of this college, I beg to submit for consideration some very favorable results, I have obtained from the application of *cold wet packing* in the treatment of parturient apoplexy, or milk fever. Before, however, taking up the practical part of the subject, I may be pardoned, if I notice some of the chief characteristics by which this disease may be recognized, for this is a complaint which is not familiar, except indeed by name alone, to many of those breeders who only raise one or two animals annually, and unfortunately the number of animals that are invaded by it, is on the increase from year to year, in direct ratio with the improvement in milch cattle. It is very important that it should be detected, as soon as it makes its appearance, for I do not know of any disease where the old adage of a "stitch in time, etc.," can be more appropriately applied, than to the one under consideration, and the remedy which I shall further on allude to, has, in those instances that I have applied it, "nip ped the disease in the bud."

SYMPTOMS.

In those cases which I have had an opportunity of observing in the early stage, the first evidence of something being wrong was an exhibition of general restlessness, and loss of appetite, accompanied in many instances by rigors, or in other words a chill; which is often more or less confined to the hind quarters; this is usually followed by what is called by veterinarians, paddling of the hind feet, which consists in an uneasy movement of them, during which they are lifted, first one, then the other, from the ground, and put down again, not exactly with a kick, but rather a paddling like motion. At this stage there is usually a profuse discharge of tears from the eyes, the countenance is one of anxiety and distress, when singularly enough, the mother seems to lose all interest in her offspring, and will not notice it. If the affected animal is required to walk, it will do so with a staggering gait, or will even drop behind, or fall down.

The secretion of milk is much diminished, or perhaps stopped altogether. The above may be considered as the symptoms of the first stage to be followed, however, in somewhat rapid succession by those of

THE SECOND STAGE,

In which paralysis, and impairment of those organs which control consciousness, are most noticeable. The unfortunate animal will lie or fall down, and is often unable to rise, although it may make frequent attempts to do so, but eventually gives up, completely discouraged. At this point the head will be flung around to the right side and kept there persistently. The muscles upon the side of the neck become firmly contracted; even when the head is brought by force into its natural position, a sort of kink will appear in the side of the neck towards which the head is thrown, and which I have seen remain for some days after the animal was able to walk about. In other instances I have seen cases where the animals would rest their heads upon their horns, thrown back against the floor. In these cases care must be taken to prevent the animal from breaking off the flints, or horn cores, by the force they occasionally use in flinging their heads about.

IN THE THIRD STAGE,

The animal drops into a profound sleep, when it will lie almost motionless, breathing, it may be, with a loud snoring sound, the cheeks becoming inflamed at every expiration; things go from bad to worse until death eventually closes the scene. Once in a while though one will meet with a case where this profound sleep appears to do the animal a great deal of good, for it will awaken to make a rapid recovery.

The foregoing manifestations, together with others not perhaps so perceptible, will be observed to a greater or less extent in every pure case of this disease.

TREATMENT.

Before describing the manner of applying the *pack*, I would like to say a few words as to how I came to adopt this form of treatment. In short, some time ago I was called upon to visit a cow attacked with some unknown disease (unknown to the owner). I was not long in determining that I had a case of parturient apoplexy to deal with, but in passing my hand over the animal's body, during my examination I observed it to be bedewed with moisture, which I thought was water, it being a wet day, and asked the owner how he came to leave so sick a cow out in the rain to which he replied that "she had not been out in the rain, but had been in the stable where I was then examining her, since she was first taken." I must admit I was somewhat astonished, but a closer examination revealed that the moisture was *sweat* from *the skin* and not rain-water. This most unusual occurrence caused me to reflect before proceeding with my usual treatment, but soon concluded that nature was doing all she could to throw off, as it were, the disease, and did not feel disposed to interfere with any of my own medicaments, but rather tried to help nature, in her effort, by placing plenty of dry straw around the cow, and a light, warm blanket over her, and after attending to some of her more immediate wants, it being late at night I left her, not before, however, telling the owner to come for me if she showed any evidence of not progressing favorably, and explained to him why I did not there and then give the cow some medicine. The next morning she was much better, and in the afternoon was able to walk about, although paralyzed and unable to rise the night before. With careful feeding she made an excellent recovery. This case and others have made a very strong impression on me that the diaphoretic (a remedy which causes a discharge of perspiration from the skin) form of treatment is the sheet anchor in this disease, but the difficulty was to get one whose virtues were not more than counterbalanced by other circumstances. I have often longed to try the Turkish bath in these cases; unfortunately this kind of diaphoretic is not one that can be carried about conveniently, so that it becomes impracticable. I have tried the hot blanket with variable success. The difficulty with them is the trouble of applying them properly, and it is hard to get attendants to make the changes at the proper times, or to do so in such a way as to prevent the animal from getting a chill; then the hot water is often inconvenient; the boiler perhaps being some distance from the stable, with many minor difficulties perhaps too numerous to mention. The cold wet pack has from time to time been brought under my notice, and eventually I was induced to try it, and I must say that in my experience it has done all that could be desired. Then it can always be procured; not only that, but it can be procured readily, which is an invaluable advantage in this disease, for before the malady has had time to prostrate the animal, you have it headed off as it were, and before other remedies would have time to act, with this on the animal is often on a fair way towards recovery.

Before applying the *cold wet pack*, the owner or attendant must make up his mind to do the work thoroughly, or perhaps it will be better not to do it at all. So for the benefit of those who wish to try it, I shall now describe the manner in which I proceeded in detail. Before putting on the sheet, I consider it a good plan to rub the animal, say for four inches on both sides of the centre of the spine, and from the withers to the tail, with the best mustard, made up as for table use, and rub in for about 15 minutes. This may be left on for two days. To apply the pack, take say a bed sheet and wring it out of cold water and wrap it around the cow; every part but the head may be covered; if one sheet is not large enough, sew two together. On top of the sheet place say two pair of the lightest and warmest blankets that can be obtained. Nothing could be better than these light cotton batting comforters, so popular now in every household. Over all place an oil cloth of some kind, or other close fabric that will keep the heat in. Those parts of the body, the legs, etc., which are not covered by the sheet must be covered with straw, or other material, for they must be kept warm. In the course of half an hour or so after the pack has been applied, the body will be thrown into a profuse perspiration, and will continue so for an hour or so, but as soon as the skin begins to get cool, then preparation must be made for a second pack, and the changing must be quickly affected, or too long exposure will do more harm than the next pack will do good. If the wet sheets can be changed without removing the top coverings all the better. Some animals are exceedingly restless during the progress of this disease, and it is these that give so much trouble and require constant watching to keep the pack in its place. Others will show much uneasiness of the head, which may be modified by tieing cold wet cloths around and across their horns. With regard to the length of time the pack requires to be applied I cannot say; in my own experience the symptoms have always been relieved in twelve hours, sometimes in half that time. After it is taken off, care must be taken that the skin is kept moderately warm. While the symptoms last the cow must be kept from throwing itself over on its side; this may be done by packing sacks filled with straw against its sides. The milk should be drawn several times a day, and the bladder emptied; this latter operation requires the assistance of a veterinarian to show the attendant how to do it. When certain complications occur, such as distention of the rumen with gas, etc., the remedies which are calculated to relieve them must be used, but I think these should be left to a veterinary surgeon. But to return once more to the pack, I may say that I have had experience with it which justifies me in saying that it will often overcome the disease without any other treatment, and even if it does not in all instances it will at all events keep it in abeyance until proper veterinary assistance can be procured. When the animal recovers it should be fed for a few days, say a week, on soft diet, and receive a little daily exercise.

E. A. A. Grange,
Professor, Veterinary Science.

September 1, 1885.
—*Farmers' Review.*]

THE ADULTERATION OF MILK.

At the Milk Conference in connection with the London Dairy Show lately, the following paper was read for Sir J. B. Lawes by Mr. Jas. Howard, M.P.:—

The milk trade in the metropolis is at the present time in a somewhat unsatisfactory state. It is not merely that the producer receives a very low price for the milk he supplies, for in this he merely shares the fate of all those who obtain their living from the products of the dairy, but because the law which makes it a punishable offence to sell milk that has been adulterated—or what in most cases is milk diluted with water—does not recognise as a fact that the quality of the milk from some breeds of cows is so high that even if it were mixed with a considerable amount of water, it might still be richer than genuine milk, which was the product of other cows fed on a lower description of food. The result is that the law in regard to the sale of milk unintentionally gives every encouragement to the sales, not of *pure* unadulterated milk, but of poor unadulterated milk.

It is quite evident that under the present system many breeds of cows which produce a high quality of milk are altogether excluded from the dairy of the farmer, in consequence of his not being able to get a higher price on account of its better quality, while he cannot afford to sell it at the same price as the ordinary milk. As a matter of fact, the production of the largest quantity of genuine pure milk is the great secret of success in the present state of affairs.

At Rothamsted we have recently been investigating several questions with regard to the production of milk, and our investigations will be continued. Now, suppose we found that, by a certain combination of food, a milk of an unusually low percentage of solids could be obtained, would not this be hailed by the milk-selling farmers as a far greater boon than any process by which a much higher percentage could be produced? It may possibly be said that such a milk would not be saleable, but this is quite a mistake. It is true that dealers might raise some objection, as although they will not pay for high class milk according to its value, still they like to have it. The public, however, would buy the low percentage milk readily enough. It does not further follow that the milk of poor quality would taste poor: we have lately shown that milk from silage, which, from its colour and taste, appeared richer than the milk from mangels, was not so rich in reality; and it is a well-known fact that the purest sugars are not those which taste the sweetest. At all events, without anticipating what may be in store in the future, it must be admitted that the principle of offering a premium for the cow, which produces the largest quantity of poor milk, is one which requires some modification.

It is quite evident that the weak spot of the present arrangement is the want of some standard or basis on which the trade shall be regulated. To say that a person shall be punished for selling adulterated milk, and then to leave the definition of what is and what is not pure milk to experts and magistrates—who possibly may differ considerably in their views upon the subject is hardly fair upon the producer. It is, however, much more easy to point out the objections to the present system, than to suggest a remedy. Assuming it is desirable that a standard should be fixed defining what is pure milk—the question then arises, What is the standard to be? If it were fixed very low, so as to include the poorest milk ever produced, the result would be that all milk would be diluted down to that standard. If, on the other hand, a high standard were fixed, it would necessarily exclude some very poor, but yet genuine milk.

Let us assume that a certain quality of milk was agreed upon by producers and experts as a fair average to represent genuine milk, and that this was declared to be the standard. The result would be that those who were so inclined would be enabled to keep cows yielding a very high quality of milk as it would no longer be an offence to dilute such milk to the fixed standard. On the other hand, why should not other qualities of milk be sold, provided the seller stated the amount of dilution to which it was subject?

There is another part of the milk trade which requires some reform. I allude to the large cost incurred in the distribution of the milk, which affects it seriously as a cheap food. The sky-blue liquid which used to be sold in London had no pretensions to be called a food, but genuine milk—were it not for the cost of distribution—would be a very cheap food, especially for the young, and although milk is not so well adapted to be the food of grown up people as meat, it is a perfect food for children, and, at the same time, very much cheaper than meat.

I do not know how far the police regulations would admit of such a proceeding, but if milk, instead of being sent up to its destination in churns, could be conveyed by rail in a tank upon wheels, it might be sold direct to the consumers with very little addition to the cost of production, and it would thus become a staple article of food to the poor.

If the demand for milk is to keep pace with the increased supply some such process must be adopted, and the producer and the consumer must be brought together without the intervention of the middleman. Mayfair and Belgravia may still continue to receive their daily supply through the middleman, if such be their wish, but the time is come when an effort should be made to furnish the teeming population of the metropolis with cheap milk as a portion of their daily sustenance.

In the course of a discussion which followed, Mr. Barham threw out a suggestion for cheapening the distribution of milk which appeared to elicit approbation from the meeting. This was that the public ought to be content with one delivery a day in winter, and that if this took place in the afternoon the cost of distribution would be so far lessened that the price to the consumer might be considerably decreased. The same speaker defended milk dealers from the charge brought against them by Sir James Caird of making exorbitant profits, showing that few of the milk companies were paying good dividends to their shareholders; that they never heard of milk vendors making fortunes, like brewers and middlemen; and that, fairly estimating the immense labour and persistent attention required by consumers, and devolving on those who conducted the milk trade, the disproportion between the wholesale and retail rates of milk was by no means so great as in those of many other articles. He thought, however, that in good time the entire milk trade might become revolutionised, as soon as the public had been educated sufficiently to perceive that separated milk is a more healthy food, and in every way more suitable, both for children and adults than whole milk containing the cream. By separated milk Mr. Barham meant, of course, skim-milk; but the variety of it which has been separated from its cream by a mechanical separator, or other means, immediately after being drawn from the cow, and thus in a condition of perfect sweetness and freshness.

Other speakers fully endorsed this opinion, and it was stated that separated milk might be retailed at about one-half the price of whole milk.—*North British Agriculturist.*

THE CAUSE OF MILK SICKNESS.

The prevalence of poisonous plants in wild woods, pastures and on ranges requires a correct knowledge of their habits of growth, characteristics and appearance, as necessary to all who herd or pasture stock where such plants may be suspected. The reported outbreak of milk sickness in some timbered pastures of southern India, and in other similar localities, lately, recalls the time years ago, and occasionally since when farmers in infected regions dared neither use the milk of their cows nor the butter made from the milk. Investigation at that time seemed to point to a plant of the genus Eupatorium, yet no really conclusive evidence seems to have fixed the real source definitely. According to a statement of Prof. N. S. Townsend in the Ohio report of 1873, Mr. John Rowe experimented with plants of white snake-root, producing fatal results in a cow, and attested by a number of reputable gentlemen. In 1859 Mr. W. S. Vermilya, in Ashland county, Ohio, is said also to have produced the disease called milk-sickness with this weed. On the other hand, cases have been noticed in wild pastures said not to have contained the plant. Hence there is yet a large difference of opinion in relation to this matter, and the writer can only record such facts as would seem to be well borne out, in hopes that careful investigation by competent botanists will be made.

The outbreak seems generally confined to dry seasons, and the difficulty was supposed to arise from drinking the water of mineral springs, to which cattle were obliged to resort at such times. The infection was at last fairly relegated to certain plants found in low, moist situations in the timber, first suspected from the fact that animals kept on cultivated pasture were not affected.

The difficulty was at length fairly well traced to eating the plant known as white snake-root (*Eupatorium ageratoides*), and fed to cattle, horses and sheep, they become affected with all the symptoms of the disease known as "trembles" and "milk-sick." There are many varieties of Eupatorium (Thoroughwort) valuable in medicine. The plant in question, white snake-root, is common in rich woods and undergrowths in the North, specially in moist situations. The leaves of this plant are broadly ovate (oval, but broader near the base), and on long petioles or stems. They are pointed, coarsely and sharply toothed, thin, and four to five inches long. In open fields the weed grows near fences, old logs, stumps, etc., where it may get the requisite moisture. It will not grow in a meadow or pasture except in the situations indicated. It is eaten by horses, cattle, and sheep, but not naturally. That is, they eat it only when other food is scarce, or when starved to it, but with eating the taste increases. Its decrease with settlement, and the added fact that only in seasons of short pasture it is injurious, should cause every farmer in regions where it has ever been known to do damage to seek it out and destroy it.—*Chicago Tribune.*

EGGS IN WINTER.

One of the essentials for inducing hens to lay in winter is warm, comfortable quarters. With lumber and building paper used so as to furnish air spaces in the sides and roof, and with no chance for cold air to come in at the bottom, a chicken house can be made so warm that when well stocked with chickens it will scarcely freeze inside in the coldest weather; the heat generated and given off by the chickens will keep the temperature above freezing. But in such case, unless provision is made for ventilation, the air will become impure, and the chickens will sicken and die. How this ventilation can be arranged is shown by the following from the New York *Tribune.*

The editor of a leading poultry paper has said that a hen house sunk into the ground is objectionable because, being inclosed on two or three sides, it cannot be ventilated. Now, there is no more difficulty about ventilating a cellar than a garret, if there are live animals in it to generate heat enough to make a change of air desirable. Another poultry writer says hens must be let out into open sheds to take the air every winter day. I kept, last year, twenty-five shut up three months in a house as near air-tight as I could make it, except the ventilators. The hens were happy, healthy, and laid every day, and, what was most remarkable, almost every egg set hatched. I carried a pailful of eggs to St. Albans, eight miles, on the bottom of my buggy, expecting to sell them to my grocer, but I met a man who picked out thirty of them, and took them in a common lumber-box double waggon over the hills to Fairfield, about six miles more, and every egg produced a live chick.

Dr. Riggs, of Connecticut, has a brick hennery four feet under ground and five feet above, made to be warm; he wanted eggs in winter when they brought fifty or sixty cents a dozen. The pullets were made to lay four months after they were hatched. But he found bad air in this hennery, which could not be got out; that was a point not thought of when he constructed it. So he made a flue reaching up to the gable of the roof, and running down to within four or five inches of the bottom of the hennery. He had no difficulty after that in making that room just as nice in its atmosphere as your barn or house. The draught was altogether up. Air enough came in, although the windows were as tight as they could be. The result was pure air; chickens never diseased; they were healthy and happy, crowing and cackling, and laying nice eggs. There is no need of freezing birds' combs; I have kept Leghorns for years and never had a comb freeze—*Farmers' Review.*

INDIAN MILLS.

The annual statement issued by the local Mill-Owners' Association, showing the number of Cotton Spinning and Weaving Mills in India on 30th June last, is an extremely useful compilation. The latest return is a great improvement on its predecessors, and Mr. Marshall, the Secretary of the Association, is to be congratulated on the issue of a statement which will be perused with interest by all engaged in the trade and out of it. To a correspondent, we are also indebted for a statement showing the progress of Bombay mills during the past twenty-one years, and a second one showing the growth of the entire Indian mills in the last ten years. These returns are interesting appendices to the mill-owners. In the whole of India, on 30th June last, there were 87 cotton mills, excluding five which are believed to exist, but particulars of which are not forthcoming. If these are taken into account, 92 is the total. Of the 87, 68 are in the Bombay Presidency, 49 in Bombay and suburbs, and 19 up-country. There are two in the Central Provinces, one in Central India, one in the Berars, one in Hyderabad, Deccan, three in the North-West Provinces, six in Bengal (in Calcutta), and five in the Madras Presidency. Of those of which information is wanting, one is being erected at Bangalore (in Mysore), one in Tinnevelly, one in Travancore, another in Nizam's territory, and one in Pondicherry. Confining ourselves, however, to the details of the 97 known mills, we see that the total paid up capital is put down as 766½ lakhs, while the number of spindles is given as 2,145,646 and the number of looms as 16,537. The average number of hands employed daily is entered as 67,186, and the consumption of cotton in the past twelve months as 596,749 bales of 392 pounds each. Ten years ago but 47 miles were at work in the country, possessing 1,100,112 spindles and but 9,139 looms, consequently there has been an increase in the decade of 46 per cent in the number of the mills, 48 per cent in the spindles, and 45 per cent in the looms. Previous to 1879, details are not available outside our own Presidency of the number of hands daily employed nor of the annual consumption of cotton, but in the last seven years, in round numbers, the army of workers has increased from 43,000 to 67,000 and the consumption of the raw material from 267,000 bales (392lbs. each), to over 596,000 bales, or say from 936,000 cwts to 2,088,000 cwts. This increase is very remarkable, and the only pity is that it has not been a greater financial success. Like everything else of late, the production has outstripped the consumption, and the result of the working of the majority of Indian mills during the past eighteen months is the reverse of profitable. The lesson taught in 1879, when some eight or ten concerns went into liquidation, was speedily lost, and with a return to brighter times the public again rushed in and assisted promoters to rapidly increase the number of the mills. It is true that of late we have not witnessed the dark scenes of 1879-80 repeated, but we have seen the bulk of the mills working either at a dead loss, or making just about enough to cover expenses. It has been rare, indeed, to hear of one that had made a profit. The present lull in the promoting world will do good, and ere long, when trade revives, there is little doubt that honestly worked and managed concerns will be able to make good returns to their shareholders. The coming year promises hopefully. A large crop of cotton is almost assured, and as our Yankee friends are equally well off, the price of the raw material is bound to give way, and spinners and manufacturers may look with cheerfulness to a brighter future. Turning to our correspondent's statement of the progress of Bombay—Island and Presidency—mills, we notice that while in the twenty-one years the number of the local mills has increased from ten to forty-nine, the up-country ones have increased from three to nineteen, the total advancing from thirteen to sixty-eight The number of spindles have increased locally in round numbers from 250,000 to 1,347,000 and up-country from 36,000 to 303,000. Total increase from 286,000 to 1,650,000. The number of looms has increased locally from 3,400 to 12,000, and up-country from 200 to 2,600. Total from 3,600 to 14,600. In 1865, but 7,400 persons—6,600 in Bombay and 800 up-country—were daily engaged in the mills of the Presidency. This year over 51,000 were similarly occupied, of which nearly 42,000 were employed in the city and suburbs. A record of the consumption of cotton previous to 1873 is not obtainable, but in that year we see the local consumption is given as over 67,000 bales (of 392 pounds each), and the up-country has 7,500 bales, a total of close on 75,000 bales. Twelve years later—30th June this year—the local consumption is stated as over 392,000 bales and the up-country as over 73,000 bales a total of nearly 466,000 bales.—*Times of India.*

Holloway's Pills are the medicine most in repute for curing the multifarious maladies which attack humanity when wet and cold weather gives place to more genial temperatures. In short, these Pills afford relief, if they fail of being an absolute remedy in all the disturbances of circulation, digestion, and nervous energy, which at times oppress a vast portion of the population. Under the wholesome, purifying, and strengthening powers exerted by these excellent Pills, the tongue becomes clean, the appetite improves, digestion is quickened, and assimilation rendered perfect. Holloway's medicine possesses the highly estimable property of cleansing the whole mass of blood, which, in its renovated condition, carries purity, strength, and vigour to every issue of the body.

THE COCA PLANT.

FROM Secretary of State for India, to his Excellency the Right Honorable the Governor-General of India in Council, dated India Office, London, 6th August 1885, No. 69, Revenue :—

In reply to your, letter, No. 6 (Agriculture), of 28th April last, asking for some information regarding the preparation, for the market of the leaves of the coca plant (*Erythroxylon coca*) of South America, I herewith forward copies of reports on the subject received from Sir Joseph Hooker and Surgeon-General Edward Balfour, to whom your letter, with its enclosures, was referred

ENCLOSURES.

Letter from W. J. Thiselton Dyer, Esq., to J. A. Godley, Esq., C.B., dated Royal Gardens, Kew, 4th July 1885.

I am desired by Sir Joseph Hooker to acknowledge the receipt of your letter (R. S. and C. 876) of 23rd June, transmitting copy of a letter, with enclosures, from the Government of India respecting the preparation, for the market, of the leaves of the coca plant (*Erythroxylon coca*), and asking for information upon the subject.

I am to say, in reply, that nothing can be added to the statement as to the method of drying made by Deputy Surgeon-General G. Bidie, C.I.E., in the pamphlet upon coca recently published by him at Madras. Slow drying in the sun appears to be the whole art of the matter.

I am also to state that, from a letter received from Mr. Lawson, the Director of Government Cinchona Plantations, Parks, and Gardens, Nilgiris, dated 23rd April last, there is reason to think that the difficulty met with had been overcome.

Letter from Surgeon-General E. Balfour, to the Under Secretary of State for India, dated 2, Oxford Square, Hyde Park, London 7th July 1885.

Your letter of 23rd ultimo enclosed a communication from the Government of India asking information regarding the mode of preparing coca leaves for the market; also instructions regarding the cultivation of the plant, and how the leaves are commonly used in South America. I have given a very considerable amount of information on these points under the headings "Coca" and "Erythroxylon" in the 3rd edition of my Cyclopædia of India; but, on receipt of your letter, I waited on Mr. Gale, of Messrs. Bell and Co., who has given me much information, and has obligingly obtained, from Mr. Tanner, the accompanying samples of the leaves, flowers, and fruit.

2. Mr. Gale is of opinion that the leaves, when drying, naturally retain a flattened form, just as senna leaves do, and it is considered unlikely that any particular drying process is followed. But the Foreign Office, through her Majesty's Consuls, could obtain all the details as to the cultivating, and as to gathering, drying and packing the leaves, with the ordinary market price in the locality, and the various modes in which the leaves are used. I could apply to the Consular Department to obtain this information, though such an application might, perhaps, come better from yourself. I have, however, ascertained that, at present, the records of the Foreign Office do not contain any notice of this plant

3. I may here mention some points of interest which have become known to me whilst I was collecting the information necessary for replying to your letter.

The leaves, as seen in the market, are of the greenish hue, observable in the accompanying sample.

The price of the leaves has fallen so low, with a prospect of a still greater fall, that it is not, at present, deemed advisable for any grower to incur any large expenditure for its cultivation.

I am informed that Mr. Howard recently bought up all the leaves in the market at three shillings the pound; and, as a consignment of 30,000 lbs. is on the way for New York, Germany, and London, the price is expected shortly to fall to six pence the pound.

It is brought to this country in bags, in which the leaves are found much broken.

At present, about ten grains of the cocaine alkaloid are obtained from one pound of the leaves; and, on the 26th June, Messrs. Bell and Co. were selling it to medical men at one shilling the grain, and a retail price of one shilling and three pence the grain.

4. Besides the use of the cocaine alkaloid as an anæsthetic in ophthalmic surgery, and during operations on the mouth, ear, and throat, pharmaceutists have already prepared from the leaves a medicinal wine and an extract, and I think it possible, even probable, that the leaves may take their place as a tea plant, or as a valuable addition to the tea and coffee of commerce.

5. Also, it is yet to be ascertained whether the species of *Erythroxylon* growing in the East Indies * may possess properties identical with that of the *Erythroxylon coca*. When this view occurred to me, I asked Surgeon-General Short to ascertain its importance. I meant that the leaves might be chewed as a masticatory, in the manner that they were used by Weston the pedestrian; but Dr. Shortt has not informed me if he tried that mode. He sent, however, to Mr. Edmund Blyth, the Analyst for the Marylebone district, twenty pounds of the leaves of the *E. monogynum*. That quantity was too small for experimenting with, but Mr. Blyth authoritatively ascertained the presence of an alkaloid. There would be a valuable addition to the food plants of the whole human race, if it be ascertained that the Indian species of *Erythroxylon* possess, like the *E. coca*, the staying properties of tea and coffee.

6. The institution of enquiries of this kind has ever formed a prominent feature in the British administration of India, but I think that this is one meriting investigation. But under the headings "Coca" and "Erythroxylon" in my "Cyclopædia of India," just published, where I have noted the alkaloid and the species of genus, it was necessarily only with the brevity requisite for keeping each article in due subordination to the other 35,000 which the book contains. And if the suggested inquiry be undertaken, it seems desirable that it be conducted, as regards the verification of the plants, under the superintendence of Sir Joseph Hooker, in order to make certain that the proper plants have been gathered from, as the species of this genus have presented difficulties to botanists, and the plants and their species, as they now stand, have been allotted to other genera and other species.

FOOT-AND-MOUTH DISEASE.

MR. JAMES HOWARD, M. P., Clapham Park, Bedfordshire, writes :—After having inflicted prodigious losses upon the country, this insidious disease was some months ago after great efforts and an infinite amount of inconvenience, practically stamped out in the three kingdoms; dying embers have, however, from time to time been rekindled in various places, but instead of treating these isolated outbreaks as a fire would be treated, the Agricultural Department of the Government has contented itself with methods which have proved so dangerous and disastrous in the past—viz., isolation and veterinary treatment. In order to spare the life of a few animals, instead of turning them into beef and mutton a few weeks before their time, the country has been exposed to the most serious risks, great expense has been entailed upon localities, and breeders and exporters subjected to a vast amount of inconvenience and loss. Breeders of pedigree stock have much reason to complain, for in many cases they have been prevented sending their animals abroad in consequence of other countries prohibiting importation, whenever we are unable to show a clean bill of health in respect of foot-and-mouth disease.

Not many days ago no less than eleven centres of disease existed in three different counties, and more than a hundred animals were affected. If these animals had been landed at our ports not a moment would have been lost in slaughtering them, and had a single day been suffered to elapse the indignation which would have been expressed at the neglect can readily be imagined.

I would ask, are not these centres of disease in the heart of our great grazing districts infinitely more dangerous, than if at either of our ports of landing each with its isolated 'foreign animals wharf'?

What must the dwellers in towns think of the sincerity of certain alarmists and exclusionists when the presence of disease in the heart of the country is tolerated by them with so much equanimity. Surely all Mr. Chaplin's former valiancy has not oozed out in the office of his department. I have long contended that isolated outbreaks of contagious disease, should be treated like the outbreak of a fire, and Mr. Chaplin formerly agreed with me on this point.

Section 29 of the Contagious Disease (Animals) Act, 1878, is as follows:—'The Privy Council may from time to time make such orders as they think fit, subject and according to the provisions of this Act, for directing or authorising, in case of the existence of any disease other than cattle plague or pleuro-pneumonia, slaughter of animals by local authorities, either generally or in particular instances, and in all or any of such cases payment for compensation of the same by local authorities out of the local rate.' This clause, I contend confers power upon the Privy Council in respect of foot-and mouth disease. Lord Carlingford and others have taken a different view, alleging that the methods of dealing with this disease are prescribed by sections 22, 23, 24, 25, and 26, under the heading 'Foot-and-mouth Disease,' and therefore section 29 is not applicable, and is intended only for other diseases than those specifically provided for by the Act.

In reference to this contention, I would point out that the method of dealing with cattle-plague and pleuro-pneumonia are also prescribed for by separate clauses and under their respective headings, and yet section 29, while it refers to the above diseases, makes no mention of foot-and-mouth complaint; surely if the intention had been to exclude the disease it would have been sacrificed as well as the other two; but, whatever the intention of the authors, the fact remains that foot-and-mouth is not excluded. The reason of the exclusion to my mind is obvious; in the clauses relating to plague and pleuro, powers to slaughter and to pay compensation are conferred, while in the clauses relating to foot-and-mouth no such powers are given; hence the particular phraseology of clause 29, and the provisions which it makes for slaughter and compensation; it is as much as to say that if the foregoing regulations fail, then the Privy Council are endowed with more general powers, for the clause is headed, 'Slaughter in Disease and Compensation generally.'

The disease is again on the decline, and is now, as it were, in a nutshell; but the time for movement of cattle throughout the kingdom is upon us. Seeing how great are the perils of another wide-spread attack of the insidious and dangerous plague, will not the wisest step be to stamp it out, while within manageable limits? If a wider interpretation be given to clause 29 than was intended by its framers, who, I ask, will be endamaged?—*North British Agriculturist.*

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* E. Burmanicum, Griff., of the Eastern Peninsula, Andamans, and Tenasserim, is E. retusum, Bauer.

E. Kunthianum, Wall. Cat., of Eastern Bengal and Khassia.

E. lanceolatum, Wight's Ill., Western Peninsula, is Sethia lanceolata, Thw. and S. erythroxyloides, Wight.

E. lucidum, Moon's Cat. of Ceylon, is Sethia acuminata, Arn. Wight, Thw.

E. monogynum, Rox. Cor. Pl. of Ceylon and Western Peninsula, is E. Indicum, Bedd., and Sethia Indica, D. C.

E. obtusifolium, Thw. En., is of Ceylon.

E. sideroxyloides, Lam., is of Mauritius.

A SKILFUL SURGICAL OPERATION.

The American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billorth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended wth the following symptoms :—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "all gone" sensation ; a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation ; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow ; the hands and feet become cold and sticky—a cold perspiration. The sufferer feels tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times ; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often-times there is a palpitation of the heart, and the patient fears he may have heart-disease. Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomes closed, or nearly so. Although this disease is indeed alarming, sufferers with the above-named symptoms should not feel nervous, for nine hundred and ninety-nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner. The safest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White (Limited), 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

St. Mary-street, Peterborough.
November 29th, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr. A. J. White. William Brent.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer described it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Sd,) Vincent A. Wills,
To Mr. A. J. White. Chemist-Dentist, Merthyr Tydvil.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

Preston, Sept. 21st, 1883.

My dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully, in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.

I am, dear Sir, yours faithfully,
To A. J. White, Esq. (Signed) W. Bowker.

Spanish Town, Jamaica, West Indies, October 24, 1882.

Dear Sir,—I write to inform you that I have derived great benefit from "Seigel's Syrup." For some years I have suffered from liver complaint, with its many and varied concomitant evils, so that my life was a perpetual misery. Twelve months ago I was induced to try Seigel's Syrup, and although rather sceptical, having tried so many reputed infallible remedies, I determined to give it at least a fair trial. In two or three days I felt considerably better, and now at the end of twelve months (having continued taking it), I am glad to say that I am a different being altogether. It is said of certain pens that they "come as a boon and a blessing to men," and I have no reason to doubt the truthfulness of the statement. I can truly say, however, that Seigel's Syrup has come as a "boon and a blessing" to me. I have recommended it to several fellow-sufferers from this distressing complaint, and their testimony is quite in accordance with my own. Gratitude for the benefit I have derived from the excellent preparation, prompts me to furnish you with this unsolicited testimonial.

I am, dear Sir,
Yours ever gratefully,
(Signed) Carey B. Berry,
A. J. White, Esq. Baptist Missionary.

Hensingham, Whitehaven, October 16, 1882.

Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(C.) (Signed) John H. Lightfoot.

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"We recommended your *Red Jamaica Sarsaparilla*."—*Medical Review.*

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Editorial Notes.

We are unable to give the usual official health, crop, and weather report for the week ending the 11th instant, as, owing to the change of Government from Simla to the plains, it has not been published this week.

⁂

It has been decided by the Government of Madras that all candidates for employment in the grade of Sub-Assistant Conservator, whether selected from the ranks of Forest Rangers or appointed direct, must in future be required to undergo the course of training at the Dehra Doon Forest School.

⁂

Mr. Chisholm, the Consulting Architect to the Government of Madras, who was asked for his opinion in reference to the value of Coimbatore lime-stone, has stated that it is not a sound building stone, being too chippy to admit of fine carving, and too soft to receive a lasting polish. He believes, however, that if the quarrymen worked deeper, a much sounder material could be put in the market ; at present, though much handsomer, it is far inferior to Pallavaram granite and three or four times as costly, delivered in Madras. He cited as an example the columns of the Anderson Memorial opposite Government House which are of the pink Coimbatore stone, and were originally highly polished. The capitals and bases are of white Coimbatore limestone and exhibit its sculptural properties. Also, that the corbel columns and capitals on the exterior face of the carriage exit of the new Central Station, Madras, are also of Coimbatore limestone. He does not think the public generally notice any difference between these stones and the cheaper and more trustworthy local stones.

⁂

Messrs. Lloyd & Co., Managing Agents for the Chenga Tea Company, have addressed the following interesting letter to the Agri-Horticultural Society of India, on the important subject of Tea Blights :—

"A short time back we handed you specimens of mosquito blight and blighted leaf sent down by our Manager, and in continuation, we beg to place before you the following remarks, which form part of his monthly report :—

"'Mosquito Blight had spread all over the cultivation on the Factory and Bungalow side, as well as that portion called 'Jungiukatu,' so that the yield of leaf was considerably lessened by it. Specimens of the fly and blighted leaf were forwarded to Calcutta for Managing Agents' inspection and satisfaction to show damage done. I have every reason for believing the species of Toon trees planted along the roads of the garden are the great harbingers of this pest for I have noted both in the hills and here these trees are always more or less blighted the whole year round, and the tea bushes under them and near by are always the first to be attacked : wherever toon trees are on the garden, the blight is worst, so that I would recommend every tree being cut down, as they are perfectly useless and valueless—all leaves and small branches to be burnt, the stems or trunks can be used for engine wood.'

"This is the first time that we have heard the presence of this pest attributed to the growth of toon wood trees, adjacent to the Tea Can you inform us whether you have any record supporting Mr. Helps's theory."

There has been a good deal of discussion in the Southern Presidency regarding a scheme for carrying out experiments in diversified cropping. The Agricultural Reporter to the Government of Madras has submitted certain proposals, which have been commented upon by the Director of Agriculture, and both have been reviewed by the Board of Revenue. The following order of the Government (condensed) will give a fair idea of what is meant by diversified cropping, and what the Government have in view :—

The Government do not consider it necessary that any preliminary inquiry should be undertaken as to "what is the least amount of water required to raise a remunerative crop of paddy," or as to "whether the possibly irrigable area can be largely increased." There is no doubt that the area of irrigated land can be largely extended, provided a sufficient supply of water is available ; and it is for the precise purpose of ascertaining whether the existing supply can be advantageously economized so as to provide a large margin for extension that the proposed experiments have been suggested. As to the amount of water required for paddy cultivation, it is not likely that anything will at present be added to the information contained in G.O., 21st May 1885, No. 473 I. The subject is one that has long engaged, and is still engaging, the attention of the Irrigation Department, but there is no reason why, pending the result of such researches, the experiments proposed by the Director of Agriculture should be delayed.

What is wanted is not "land not affected by previous treatment or surrounding irrigation," but land which has for some time been cropped with paddy and on which the crop has presumably deteriorated in consequence, and become subject to disease. It is with a view to the improvement of land of this sort, of which there are, it cannot be doubted, large areas in this presidency, that experiments are proposed. Land of the kind desired by Mr. Benson would, even if discoverable, be in no way typical of the rice lands of the country generally.

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A "staff to conduct and record the progress of the experiments" is not necessary, if the experiments are to be conducted, as proposed by private landowners, under the supervision and with the advice of the department. All that is required is, that progress should be watched and reported by a competent officer. So, again, there is no need to await "more knowledge as to our Indian crops," if the experiments are conducted on private land. Such knowledge will be acquired by the department from the experiments themselves. *It is unsatisfactory, after twenty years of experiment at Saidapet, to find the plea of want of knowledge put forward.*

The only other condition precedent mentioned by Mr. Benson is "time sufficient to carry the experiments to some good end." Sufficient time will, of course, be allowed. The Government agree in the opinion that detailed information is not for present purposes required in regard to irrigation in Italy, Spain, &c.

As regards the selection of a suitable tract or suitable tracts of land, the Government resolve to direct that the Collectors of Kurnool, Godavari and Kistna be consulted. It is observed that in Kurnool and Cuddapah somewhat similar arrangements are now in force for the encouragement of irrigation, while in Godavari it is believed that the alternation of wet and dry crops on irrigated land is already practised to some extent.

The words we have italicised speak volumes. When referring to this subject a short time back, we took occasion to notice the extraordinary nature of this plea, and commented upon it in terms not flattering to those who had put it forward. We are therefore glad to see that the Government have marked their sense of this unsatisfactory plea of want of knowledge.

Captain Catania, of Dharur, in the Nizam's State, writing to the Agri-Horticultural Society of India in reference to Mr. Dumaine's paper on tusseur silkworms, says :—

"I find I am greatly ahead of Mr. Dumaine in the domestication and propagation of the Tusser silkworm. I will send you a detailed account of my system of domestication at the end of the season. Mr. Dumaine speaks of gathering only *two* crops a year at Hazaribagh. We have *three* in the Deccan, and I cannot understand why there should be this difference, considering the worm is the same and the habits identical. In the same letter he says : Are you aware that the Cotton of *Cochlospermum Gossypium* is an article of commerce in Holland? Should you wish it, I will write and enquire the price it is sold at. I believe large quantities are sent to Amsterdam from Java. We have the tree by millions in our jungles, but hitherto it has not been utilized." Captain Catania has been asked for any additional information he may be able to furnish, together with a sample of the cotton to be obtained from Holland, if possible, to guard against mistakes.

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The following is a summary of Messrs. William James and Henry Thompson's fortnightly circular of Indian Tea, dated London, 22nd October, 1885 :—

Since the 8th instant 49,000 packages have been brought to auction, including 2,200 from Ceylon and 500 of reprinted tea. At the early sales prices showed weakness and irregularity, but later on the tone improved, and prices closed last Thursday without change, except for common Pekoe Souchongs, which were ½d. cheaper. This week the feature has been the sustained demand at previous rates for tea "for price"—and at rather dearer prices for fine Pekoe Souchongs and Broken Teas. On the other hand, fine Assam Pekoes have not maintained their value, many sales showing 1d. to 2d. decline. The less active competition for Darjeeling teas must also be noticed, poor liquoring marks having receded very near to the low rates touched last season, when well-made Pekoes were selling at 11d. to 11½d. per lb. ; while some of the finer qualities are selling cheaper than they were a month ago. The shipments from Ceylon for the season ending 30th September were 3,800,000 lbs. Estimates of the next crop range between 6,000,000 and 7,000,000 lbs. The shipments from China at the end of September had reached a total of 116,000,000 lbs., as compared with 117,000,000 last season. The market is quiet, but the tone is steadier, with a hardening tendency for Congous under 7d. per lb.

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A short time back we noticed the result of the enquiries instituted in Burmah, as to whether salt formed an article of diet for cattle, and to what extent it was used by the Burmese in this respect. Our own opinion was that many of the diseases to which cattle are subject might be traced to the want of salt in their diet. The report of Mr. Cabaniss, the Assistant Director of Agriculture, British Burmah, on this subject, pointed to the craving for salt being a perfectly natural one in cattle. He said : "I have noticed the cattle fighting amongst themselves, to get at a salt-lick." The following, which we extract from the *Farmers' Review*, bears out the 'natural-craving' theory in reference to salt for cattle :—

Some writers recently have advanced the idea that the supply of salt to animals is wholly unnecessary, that the appetite for it in both animals and human beings is an artificially acquired one, and not a natural craving. But when the writer was enjoying his vacation a few weeks since on the Brule river in the Lake Superior country, his camp happened to be near a couple of natural salt-licks which were frequented by deer in such numbers that the ground was trodden by them like a barn yard in which a flock of sheep are kept. Now how did the wild deer in the woods acquire an artificial appetite for salt, or was their desire for it a natural craving, indicating a need of the physical system which salt alone will supply? To our mind very clearly the latter. The man who has the well-being of his live-stock at heart will see that they are supplied with salt to meet this craving of their nature. Pieces of rock salt to which they have access at all times is a better method of administering it, than to feed it to them in quantity at regular or irregular times.

Dr. Bonavia, of Etawah, has of late been making praiseworthy efforts to bring prominently to notice the valuable medicinal properties of the *citrus*, or orange family. In a recent letter to the Agri-Horticultural Society of India, he says :—

"Allow me to bring to the notice of the Agricultural and Horticultural Society of India, the great importance of the genus *citrus* from a medicinal point of view. Dr. Maglieri, an Italian physician, had noticed that farm laborers in Italy used the decoction of lemon to recover from the cachexia left after ague, and he tried it himself with success. Dr. Lauchlan Aiken, of Rome, [illegible] Dr. Maglieri's statement, and published the result in the *British Medical Journal* of 4th October 1884, page 653. Having a number of Malta lemons, which are identical with the Italian lemons, I thought it a good opportunity of making some experiments with them. I was struck with the medicinal powers of this decoction. It is a perfect remedy for the weakness and loss of appetite after ague. For *uncomplicated* cases of quotidian fever in the three cases I have tried it, it acted like quinine. For enlarged spleen of *recent date*, even when the spleen projects to an inch of the middle line of the abdomen, it is the *best remedy* I have yet tried. The above experiments were made with the lemon, but two other cases of weakness after fever, tried with the decoction of three fresh 'kaghzi nemboos,' gave a similar result. I am now trying the large sour kind, which natives commonly call *khatt s*. It would be worth while trying experiments with all kinds of sour oranges and lemons to ascertain whether all sour varieties of the genus *citrus* have this valuable medicinal property, or only some. In that case it would be worth knowing *which* variety possesses this quality. In a country like India, where ague, and weakness and cachexia after it, and also enlarged spleen are so common, this valuable property should, I think, be made widely known. Those who have tried the decoction of Malta lemon, and also that of 'kaghzi nemboo,' say that the former has much the nicer flavour. This, though not of great, is of some importance. The way of making the decoction was pointed out in the *Pioneer* of 15th August last."

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We learn from a home contemporary, that Mr. Charles Whitehead, in connection with the question then agitating farmers, *viz.*, the increase of agricultural insect pests, intimated in May last to the Agricultural Department of the Privy Council that he was willing to prepare reports on insects injurious to hop plants, corn corps, fruit crops, and root crops. The Lords of the Council accepted Mr. Whitehead's offer, and he has now forwarded to the Council, and the department has published, the first report of the series—namely, that on insects injurious to hop plants. Mr. Whitehead states in his introduction that the risk of loss and destruction from injurious insects is increasing. The pests that mock the husbandman have long been known to be many and various. Mr. Whitehead gives several instances of new ones discovered of late years. The increase of insects follows *pari passu* the extension of culture, and the distribution of the plants which are special objects of their attacks. Insects are imported into England with agricultural produce, and they are also exported. It is a fortunate thing for us that the climate is fatal to some of the worst of agricultral pests, as, for example, the dreaded potato bug. To show how the insect nuisance is increasing, it may be mentioned that the hop aphis was unknown in America 25 years ago, and now it has become a serious trouble. Mr. Whitehead says that America has in revenge for the importation of this and other insects, retaliated by exportation into France of the phylloxera. Mr. Whitehead blames the wholesale and indiscriminate slaughter of insectivorous birds and animals. The hand of the farmer is and has been since Virgil's time against moles, and yet men wonder that wire-worms become more abundant each succeeding season. Mr. Whitehead specifies ten enemies of hops, and in each case he gives an account of the appearance of the insect, illustrated by a representation of the size, both natural and magnified, the mode of attack and results, the prevention and remedy. The hop, we find, is attacked by its own fly (*aphis humuli*), cone fly (*dilophus vulgaris*), wire-worm (*elater lineatur*), jumper (*euacanthus interruptus*), flea (*haltica concinna*), and bug (*lygus umbellatarum*), as well as by the otter moth (*hepialus humuli*), the red spider (*tetranychus telarius*), the strig miner (*psylliodes attenuatus*), and last, not least, an ugly creature—it is not to be scientifically classed as an insect, for it undergoes no transformation, and has only two stages of life—called the thousand legs (*Julus Londinensis* or *Julus guttatus*). As a remedy for the attacks of this beast, Mr. Whitehead recommends the use of paraffin.

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The turmeric crop, which is a valuable one in certain districts in Southern India, has recently come up for discussion before the Madras Government with reference to the assessment to be charged for water supplied from irrigation canals to lands taken up for turmeric cultivation; it being alleged that, as the crop remains longer in the ground than other crops, including paddy, water has to be supplied over a more extended period, whereby the irrigation revenue suffers a very considerable loss, especially when it is considered that the rate of assessment is only half that charged for paddy, which is Rs. 4 per acre. It has therefore been recommended by a superintending engineer for irrigation that the crop should be assessed at Rs. 6 per acre. The matter was, however, referred to the Collectors of Godaveri and Kistna, the latter of whom has furnished some particulars regarding the cultivation of turmeric which are interesting, and which we quote below. After defining the crop as a dry one, he says:—

> It is reported to be put down in the end of July or beginning of August, and to be dug out by about March. During the first four months the rain, if copious, is sufficient; but if the season is bad, anicut water is occasionally taken. During the remainder of the period anicut water, if available, is occasionally taken, but never continuously. Turmeric is irrigated by channel irrigation, not more than three or four times a month, while a paddy crop is always under water several inches deep. Indeed, the turmeric roots are said to rot and die if the crop is allowed to remain under water without intermission. Turmeric, therefore, takes less water than a wet crop, but more than a dry one, and it is more valuable. There is no reason to treat turmeric as a double crop, as, unlike sugar-cane, betel, or plantains, it does not remain on the ground for the time required for two crops, and it is only occasionally (three or four times a month) and not continuously irrigated. Rs. 8 an acre therefore seems an excessive charge. The principal revenue officers in the deltas have been consulted on the question. The majority are of opinion that turmeric should be treated as a single wet crop and its irrigation charged for at Rs. 4 per acre, because of the length of time (eight months) it requires, the usual deduction being allowed for lifts. In this opinion I agree. This is stated by the Collector of Godavari to be the charge for turmeric irrigated by canal water in that district. The Tahsildars of Bandar and Gudivada would keep to the existing rate of Rs. 2, because turmeric does not require continuous irrigation.

The report of the Godavery Collector is substantially the same as the above. It has therefore been decided to fix the rate of assessment at Rs. 4 per acre.

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Mr. Kennedy has contributed a very sensible article to a recent number of the *Calcutta Review*, entitled "Punjab ploughing." He says:—"Looking at the actual state of tillage in India, a scientific agriculturist will be, perhaps, inclined to think that the Indian peasant has made but little advance upon the primitive tillage which yokes a bullock to the branch of a tree for a plough and a thorn bush for a harrow, and with these rude appliances roughly scratches and harrows the soil. He may be inclined to think that, under British rule, agriculture alone of all the arts has not progressed, and still remains in the state it was before European skill and energy were brought to bear upon the industries of the East. But if we examine more closely into the subject and compare the efforts of the agriculturist with those of his ancestors, there may be found signs that the influence of scientific improvements has not been entirely unfelt. Too much must not be expected. In Europe, and especially in England, labour is dear, and every invention of machinery which can perform the work of men or horses, and every extension of the application of steam to drive such machinery proves effectual from the cheapness of fuel and the dearness of labour. But in India labour is still cheap, and labour-saving machines have not hitherto proved a success. Machines on the other hand, to increase the agricultural outturn, such as the Bihia Sugar Mill, oil-expressing machines, etc., have probably a great future before them. But until we thoroughly understand the conditions under which native husbandry is carried on, the merits or demerits of the various operations of tillage the farmer practises, and of the various implements and tools he uses, and thoroughly understand the general principles which guide his practice—and such knowledge is still in its infancy—it would be unsafe to too rashly condemn his methods, or to ask him to forego the use of appliances which he understands, and [illegible] others of which he is ignorant, and the advantages of which are still problematical." Of course, Mr. Kennedy does well to point out that improvements which work well in England may not do so in India, and should not, under the circumstances, be forced upon the acceptance of the native agriculturist, who is a bigoted conservative in his habits, and as a rule, quite innocent of education. Mr. Kennedy quotes an instructive instance of the results of the English system of ploughing on Indian lands, from the Punjab Famine Report, the writer of which was Mr. A. O. Hume, who says:—"I remember once seeing a practical English ploughman plough up a piece of land on the English system, that is, throwing the soil inland; the operation was beautifully performed, the crop germinated well, but when the time came for it to be watered, it naturally preferred to remain in the furrows between the land; the result was that the crop came to nothing. This system of ploughing in lands in England is employed on purpose to cause a surface drainage; in the Punjab we do all we can do keep moisture in the soil."

RESEARCHES ON SILK FIBRE.

The silk industry at the present time is in a state of transition. It has attracted an unusual degree of attention in France, where efforts are being made for its development to the greatest possible extent. We have before called attention to the proceedings of the Lyons Chamber of Commerce, and the exertions of Mons. N. Rondot in this connection. We have now before us a small pamphlet containing the correspondence which has passed on this subject between the Secretary of State for India and Mr. Thomas Wardle, the well-known silk dyer of Leek, Staffordshire, who is well-known through his experiments in Indian dyes and tans, and his efforts for the improvement and utilization of Indian wild silks, and also as the author of a "Hand-book of the Wild Silks of India." Referring to a letter received by him from Mons. Rondot, Mr. Wardle remarks that "in what he says about muga, he only takes a practical view of the matter from the present smallness of the importation, but I am making some investigations in silk with beautiful samples which I have received from Mr. E. Stack, Director of Agriculture in Assam, and Mr. H. S. Darrah, Officiating Director of Agriculture in Assam, and which give promise of a great future for this silk, and I am hoping to point out to you before long, and to the Indian Exhibition to be held at South Kensington next year, proofs which will warrant the encouragement of the natives of Upper India to prosecute this industry to the extent of a very large exportation. I heartily join in Monsieur Rondot's wish that India should be awakened to the importance of the greatly growing Tussur industry, and it troubles me to think that the efforts I have taken in its initiation for the good of India should be seized by the quicker Chinese. Already, at Arrah, Mr. W. Peppe is engaged in improving the reeling of Tussur silk with remarkable success, leaving nothing to be desired from advice which I have from time to time given him, and it is quite as easy for the same to be done all over India. I am quite certain that every year will see a largely increased output of this silk, if it can be obtained. Last year the French bought 8,000 bales from Shanghai. Messrs. Brocklehurst and Sons of Macclesfield, alone, used 1,000 bales of raw Tussur silk last year, and that not reckoning the waste which they largely buy and use for spinning purposes."

What Mons. Rondot said on this subject in his letter to Mr. Wardle was as follows:—

> The Tussur industry is now fairly launched at Lyons. It is no longer necessary to act in Europe in stimulating this industry, but in India. It is China which supplies us at the present time and some Chinese merchants at Chefoo conduct this trade with an activity which, I regret to say, has not been shown in India.

I have received from several merchants, or spinners of India, offers of service or sample skeins of Tussur raw, with requests for orders. As I am completely disinterested in these affairs, I have apprised the manufacturers, through the Chamber of Commerce, of these communications. You may well think that we only made them laugh (*because* of the backward state of reeling this silk*). From Chefoo I have received several [illegible] packages of silk for trial. Some manufacturers have taken them, the first time at a rather low price, and at the present the relations are direct and active. You know that we have spun at Lyons some muga cocoons which Lord Lytton had caused to be sent to me, and which I sent to the Chamber of Commerce. We know this silk at Lyons well. But to tell the truth the muga interests nobody. One could not have 100 bales of this silk. Why occupy one's self with it? One can only obtain Tussur silk with difficulty. It is not doubtful that in some time this trade will be better known, and, for the moment, it is of the exportation from India that it is necessary to think.

The apathy shewn by India in regard to the Tussur silk industry, which M. Rondot notices so forcibly, is a reproach to the country, and much to be regretted. India is the home of the Tussur worm. Efforts have, of course, been made to extend the cultivation of the Tussur, but these have been either by Government officials in isolated cases, or by amateurs. What little Tussur India does produce, is chiefly the product of cocoons collected by itinerant natives, who earn a precarious living by it. In some parts of India the industry has certainly assumed some pretensions; but taken as a whole, the Tussur industry in India is of very limited proportions indeed; and considering the demand which is being created for it in the European markets, it will be strange if some of our enterprising capitalists do not take advantage of the opportunity thus afforded them of making an effort to extend and develope an industry which has great possibilities before it.

At the ninth ordinary meeting of the Society of Arts, London, on 29th April 1885, Mr. Thomas Wardle read a most important and interesting paper on the "Researches of Silk Fibre," which we reproduce elsewhere *in extenso*. Mr. Wardle has gone minutely into the question, and we feel sure that his paper will be read out here with great interest.

At the same meeting, after the reading of Mr. Wardle's paper, the following interesting discussion took place:—

Mr. M. Blair (Glasgow) said he had recently had the opportunity of visiting India, and might say a few words about the wild silks of that country, to which he thought silk manufacturers in England had chiefly to look in the future. One of the first things which struck a visitor to India was the enormous resources of that great empire, the vegetable, animal and mineral, thoroughly explaining why it was that all the great nations which had held the East and West traffic had flourished so exceedingly—from the Babylonians and Phœnicians down to the English. The second thing, however, which struck him was the unreliable character of the people; the apathy and indifference to all ideas of improvement and advancement was something which an Englishman, and certainly which a Scotchman, could hardly comprehend. In India there was a large population living, and content to live, on the verge of starvation, and if you increased their income, one of two things took place. Either they worked half-time and so reduced their income to what it was before, or they added additional mouths to eat it up. Thus it was found that when rice was cheap, the work-people went away for half of the week, and left the machinery standing idle. This had an important bearing on the silk question. A vast quantity of silk material could be procured from India, but it would always be of poor quality unless it were prepared under European supervision. The silk was good, but it was not well reeled, and the people were too indifferent to improve it. The one thing needed for the resuscitation of the English silk trade was a large supply of cheap and good material, and for that they might look to India, not only from the *Bombyx mori*, but from other and indigenous kinds which Mr. Wardle had devoted so much time and study to; but it must be reeled better. He feared this would never be the case if they trusted only to the natives. Anything which required no very skilled labour, such as rice-growing, or perhaps cotton, they did very well, but where skill was required, they could not be depended on. If they had been trusted to grow tea, and prepare the leaves, there never would have been any Indian tea, worth speaking of, but under European supervision, this trade had grown enormously. The same policy should be pursued with regard to silk, and the machinery should be, as far as possible, automatic.

Mr. Birchenough (Macclesfield) said good reeled silk was essential to the progress of the manufacture. He had not had much to do with tussur silk, but he could see a great future for it if it were well reeled. The whole country, and especially the silk trade, were much indebted to Mr. Wardle for his investigations.

Mr. Wells said Indian Tussur raw silk was practically unknown to the London trade, and asked if Mr. Wardle alluded to [illegible] to China, when he said that a large quantity was imported.

Mr. Wardle said he referred to China tussur from Shanghai.

Mr. Wailly said he knew very little about silk, though he had done something to introduce new species of silkworm into Europe. He had lately seen carded silk from various species, such as Indian tussur, *Pernyi* from North China, and some from North America. He had sent specimens of these carded silks to the Paris Acclimatisation Society. His main work had been the introduction of the insects, and he had no doubt that, this year, the Indian tussur *Mylitta* would be acclimatised in Spain, and perhaps in some parts of Italy, though it would hardly suit the northern parts of that country, as it would take three months to rear.

Mr. Ernest Hart said he knew nothing about silk, but as one of the general public he felt deeply interested in some of the facts stated in the paper. He was much struck with the fact that some silks largely sold here only contained one-seventh or one-eighth of pure silk; and that they were manufactured chiefly for the benefit of French manufacturers, though there was no doubt that England possessed special skill both in dyeing and weaving, and also a climate peculiarly fitted for the treatment of silk. It was evident, therefore, that there must be some other element necessary for the restoration of the industry, and he gathered that that element was better technical education. If that were so, perhaps Mr. Wardle could tell them in what special direction their efforts should be turned; for he was evidently one of those men to whom this country owed so much, who added to indomitable energy and skill and industry, scientific tastes. He believed no industry could be considered in a hopeless state which had such men in its ranks.

The Chairman having proposed a hearty vote of thanks to Mr. Wardle, which was carried unanimously,

Mr. Wardle, in reply, after thanking the meeting for the compliment, said his principal feeling in this matter was one of anxiety and disappointment at the great loss which this country had sustained within the last thirty years by the gradual decay of the silk industry. It behoved every one who was anxious to regain it to set about the work at once. It was a melancholy fact, which could not be repeated too often, that for the last ten years the average value of manufactured silks imported into England from European countries had been twelve millions sterling, and he believed Mr. Birchenough would bear him out that if English manufacturers received orders for one-third that amount, it would make the silk centres of Coventry, Macclesfield, Congleton, Manchester, and Spitalfields very busy indeed. In reply to Mr. Hart's questions as to what he suggested, he would say, study carefully the report of the Commissioners on Technical Education, for if he understood it aright, it contained everything necessary to regain not only that, but any other artistic industry, either European or Eastern. It was a most valuable report, and he was sure it would do a great deal of good. It contained a vast amount of information, and the deductions which the Commissioners had drawn from their travels and observations were such as would enable any energetic person in time to overcome any difficulties. Mr. Wardle concluded by drawing attention to and describing the various specimens of silk exhibited.

The Chairman remarked that the particular researches of which Mr. Wardle had given some account, were undertaken at the instance of the Chamber of Commerce of Lyons, and had been followed by that body with the greatest interest. Although there were already excellent technical schools at Lyons, a special laboratory had been added in consequence of these researches. He drew special attention to this fact, because it was one of those significant things which showed the difference between the mode of operations here and abroad. We always had able and enterprising manufacturers, but they were left to their own unaided efforts stimulated by competition: whereas, abroad, those who had a common interest were banded together in a strong organisation which co-operated for the welfare and advancement of their particular industry. Such was the case at Lyons and elsewhere. In every industrial centre in England there was a need for the same kind of thing; and if they could ever hope to recover these industries, it must be by imitating the commercial spirit shown by our competitors abroad. He knew that many felt this difficulty and until they could bring to bear not merely individual enterprise and generosity, which was undoubted, but also something like the aid of public funds wisely administered, for the promotion of that which was known and acknowledged to be the greatest public good, they would fail in competition with our, in some respects, wiser, and in many respects more successful, competitors on the Continent.

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* Note by Mr. Wardle.

GAMBOGE.

The Government of India have been instituting enquiries into the indigenous production of gamboge in certain parts of India, and into the cost of its collection. It has been ascertained that the tree grows pretty freely in the Madras presidency. From a report by the Collector of Malabar to the Board of Revenue, we learn that there are four species of Garcinia indigenous to the forests of this district. They are :—

(1) *Garcinia morella*, which grows on the Peria ghat in the extreme north-west portion of the Wynaad taluk up to an elevation of about 1,500 feet. This species yields the tree gamboge of commerce. There is a considerable export from Ceylon, but none from the district.

(2) *Garcinia pictoria.*—This is widely distributed, and is found growing along the slopes of the Western Ghats, from 1,000 to 2,000 feet elevation. It is very abundant in the Chenat Nair forests, and fairly common everywhere. It yields an excellent pigment, samples of which were sent to the International Forestry Exhibition, Edinburgh, last year ; also to the Calcutta Exhibition. The gamboge is collected by lightly scraping the moss and the old bark off the stems of the trees, and then pricking them all over, with an instrument resembling a hair-brush, with wire nails fixed in it at intervals of ½ inch apart. The work should be done from December to March, when there is no rain. The gamboge collects in little tears, about the size of a small pea, in from three to four days, and is quite hard in a week, when it can be collected. The cost of collection amounts to about Rs. 1-8-0 per pound, which is as much as the product is worth in the London market ; hence there is no trade in it here.

The Collector says that a second way of collecting the gamboge is to clean the bark of the trees of all extraneous matter, and then to strip it off, pound and boil it. A yellow extract is thus obtained, which, when inspissated yields a golden brown gamboge of inferior quality, worth about 6*d*. a pound. The stripping of the bark, of course, kills the tree. The method is therefore a wasteful and expensive one. The fruit of both species are rich in gamboge, and the seeds yield an oil.

(3) *Xanthochymus pictorius.*—This species is indigenous to the ghat forests above Karimpoya in Nilambur. It bears a large golden-colored, thin-skinned edible fruit of a pleasant sub-acid flavor, in bunches of 3 or 4 together. It is cultivated at Calicut and in the Wynaad, and is a tree of exceedingly slow growth. The gamboge yielded by it is resinous, and worthless as a pigment.

(4) *Garcinia cambojia.*—A very common tree on the Western Ghats, up to 4,500 feet, where, however, it rarely exceeds 20 feet in height. It yields a translucid resinous gamboge useless as a pigment. The fruit is ribbed, and of a bright canary color. The aril is edible, being of a pleasant sub-acid like the mangosteen. The rind of the fruit, when green, is intensely acid, and is used by the Kurumbers and other wild tribes as a substitute for tamarind in their curries. The seeds yield an oil.

(5) *Garcinia purpurea.*—A very rare tree on the ghats, but cultivated at Calicut for the sake of its edible fruit, which is of a bright purple color. It yields a gamboge which might be used as a pigment.

Garcinias Travancorica et Wightii are both said to yield excellent pigments, but they do not occur in this district.

The Collector of Neilgheries says that *Garcinia pictoria* does not grow in any part of the district, and that no trade is carried on in gamboge yielded by the tree. The Collector of Sea Customs, Madras, who was requested to furnish particulars of the exports and imports of the product, states that there was no trade in it during the last two years. It would thus appear that, although the tree yielding the gamboge of commerce exists in an indigenous state in parts of India, it is found that it cannot be gathered at a cost sufficiently low to render it a remunerative industry. This seems strange when the cheapness of labour in India is taken into consideration. It is clear that there must be some defect in the mode of collection; for how else can it be explained that Ceylon can export the product at a profit to those who collect it in the island? Further enquiry is needed to prove beyond doubt that the development of the industry cannot be rendered profitable.

The source of the Ceylon gamboge is the *Cambogia gutta*, also known as the *Hebradendron Cambogioides.* This is probably the variety named by the Collector of Malabar as *Garcinia Cambojia.* The Siam gamboge is said to be the product of *Garcinia Cochinchinensis.* Another variety, *Garcinia elliptica*, found in Sylhet and Tavoy, also yields a kind of gamboge. The *Garcinia mangostana*, a native of Malacca, yields that splendid fruit called mangosteen. The entire order to which the *Garcinia* belong—*Clusaceæ*, are natives of hot, humid regions in the tropics, and many of the genus are found in South America.

RAIL-BORNE TRAFFIC, CENTRAL PROVINCES, 1884-85.

The returns of the railway-borne traffic of the Central Provinces, for the official year ending 31st March 1885, have just been issued. The railway stations have been divided into five blocks, grouped as follows :—

(1) *Jubbulpore*, including all stations in the Jubbulpore district.

(2) *Nerbudda*, including all stations in the Nursingpore and Hoshungabad district.

(3) *Nimar*, including all stations in that district.

(4) *Nagpore*, including all stations in the Wardha, Nagpore, Chanda, and Bhandara districts.

(5) *Chuttisgurh*, including all stations in the Rajpore district.

The only difference observable in the classification of headings, from the system hitherto in vogue, is the omission in the present report of 'treasure,' which has resulted in an enormous decrease in the calculated value of the traffic. The total traffic of the year, in so far as imports are concerned, shows a large decrease on the previous twelve months. The figures are—

1882-83.		1883-84.		1884-85.
Maunds.		*Maunds.*		*Maunds.*
34,95,239	...	42,59,666	...	36,07,974

The value of these, in rupees, was for the three years respectively—

Rs.		Rs.		Rs.
3,13,47,850	...	3,90,9[illegible],003	...	2,86,52,722

It will thus be seen that whereas in *weight* the figures, besides being very much less than for the previous year, are in excess of those for 1882-83, in *value* they show a large falling off. But it is pointed out that the figures for 1882-83 are not strictly comparable with those of the following years, as they were collected on a different system. The differences resulting from this alteration in the system of registration, are not however believed to affect the totals to any very great extent. The figures above show a decrease of 16 per cent in the amount, and 27 per cent in the value of the imports. The exports for the past three years were—

	Weight in Maunds.	
1882-83.	1883-84.	1884-85.
1,28,03,708	1,66,34,850	1,82,74,720
	Value in Rupees.	
4,19,58,746	5,46,03,013	3,96,65,493

There was thus an increase of 9 per cent in the amount, but a decrease of 28 per cent in the value of the exports. It is explained that this result is due to the non-registration of 'treasure,' as above noted, and to the rectification of what appears to have been a mistake in the traffic returns of the previous year under "intoxicating drugs." The first of these reasons is also assigned for the decline in the value of imports. The principal items of import were coal, cotton-twist, yarn and piece-goods, gunny-bags, metals, salt, sugar, and tobacco. The figures show a great decrease in coal, and an appreciable falling off in cotton piece-goods, gunny-bags, undrained sugar, and tobacco. An increase, on the other hand, is noticeable in cotton-twist and yarn, metals other than iron, and drained sugar. The rincipal items of the traffic may be contrasted as follows :—

		Quantity.		Value.	
		1883-84.	1884-85.	1883-84.	1884-85.
Coal	..	10,78,744	12,99,886	3,22,123	3,89,951
Cotton	..	1,12,865	72,723	16,92,875	10,77,209
Wheat	..	77,08,223	97,91,180	1,64,18,446	1,46,86,695
Rice	..	10,68,865	12,83,019	30,05,989	28,06,604
Other Grains	..	15,19,796	11,88,774	25,76,906	17,80,918
Hides	..	80,888	67,139	5,04,856	9,06,876
Linseed	..	20,89,558	25,11,181	65,61,119	73,76,594
Tilseed	..	9,02,075	2,60,761	34,41,448	9,94,227
Myrabolans	..	...	2,24,193	..	5,74,405
Stick Lac	..	73,729	67,282	9,58,477	12,11,076
Ghee	..	28,723	26,630	6,02,325	7,81,875

Nearly the whole of the coal was the yield of the Warora mines. Cotton has not been so low for many years past. The increase in the quantity of wheat is the largest on record, and is the produce of nearly 1,400,000 acres, or 41 per cent of the entire recorded wheat area of the provinces. The decrease in value is due to prices having come down very low, *viz.*, from Rs. 2 per maund in 1883-84, to Rs. 1-8. The whole of the wheat, practically, was consigned to Bombay. The increase in the export of linseed is remarkable ; it is chiefly the produce of the Chuttisgurh block. Myrabolans were registered separately for the first time. The trade is of comparatively recent origin, but has before it great possibilities ; and as the trees which bear the fruit (*Terminalia Myrabolana, chebula*, and *bellerica*) are found growing abundantly in the provinces, it promises to become a most productive source of forest income. It may be mentioned that Calcutta had a very small share in the traffic with the Central Provinces, almost the whole of the traffic having been done with Bombay. In comparing the exports per 1,000 acres under crop, it is found that linseed comes first, then wheat, and thirdly, rice. Our space necessarily compels us to notice the report only in the briefest possible manner. As a rule, trade returns consist chiefly of long rows of figures, that do not form very entertaining reading, but the report under reference is, however, an exception. It is comprehensive without being tedious, and Mr. Fuller has succeeded in investing it with a degree of interest that is unusual in such compilations.

Miscellaneous Items.

A CORRESPONDENT writing to one of our German exchanges says that the Flax Commission at Lille a short time ago invited the chief German, English, Belgian, and French spinners to Antwerp, in order to agree upon common conditions for the business in Russian flax, and to adopt an international convention. The Germans intimated their approval of the plan at once by telegraph, and the meeting of English, French, and Belgian spinners at Antwerp adopted the scheme with a few modifications, appointing an international committee of eight members to further the interests of spinners.

Kuhlow's says—At present Hamburg ranks as the first petroleum port of the Continent. It is interesting to observe the increase of the petroleum imports there, as shown by recent statistics. The first consignment of petroleum was received in 1860, now 25 years ago. The imports were the next year 3,210 centners, in value 53,950 marks, and in 1871 the value of the imports was 15 million marks, and in 1884 it had reached the enormous sum of 28 million marks. In the first years the average price of petroleum was 28 marks per centner, and latterly only 8·15 marks. These figures illustrate the extraordinary distribution of this article of trade.

IT is calculated that the total production of sewing machines in all the industrial States of the earth is 1,500,000, of which a good third fall to German manufactories. If the population of the earth is taken as 1,400 millions, it is found that every year one machine is made for every 930 people, though as a matter of fact, deducting for uncivilised nations, the population amongst which this trade is carried on is only some 500 millions, so that this would be one machine for every 330 civilised persons. In Germany, however, from 150 to 200 persons may be reckoned to a machine. America is the home of the modern sewing-machine, but German skill has succeeded in surpassing the American article in capability and efficiency of work.

THERE are four candidates in the field for the appointment of Superintendent of the Stud Farm and Remount Agent, Hyderabad, *viz.*, Major Gough ; Mr. Stevens, private secretary to the Nawab Khoorshed Jah ; Mr. Wilkinson, in the employment of the Nawab Vikar-ul-Oomrah, and Captain Hayes, of horse-breaking fame. The Stud Farm was established by the late Minister in 1877 for the purpose of breeding horses and cattle, and for the cultivation of grass and fodder. A few stallions are kept at Rajampett, while some thirty or forty others are placed for breeding purposes in various parts in the districts. Since the introduction of proper stud arrangements, the number of horses brought for sale to the Mallegaon fa[illegible] increased from a few hundreds to nearly four thousand.

THE imports into Kurrachee during the first half of the current official year amounted in value to over a crore of rupees ; the total for the same period of 1884 being only a little more than three-quarters of a crore The value of the exports from Kurrachee, during the first six months of this year, amounted to over two crores, against less than one and three-quarters crores for the same months of 1884. With regard to exports, it appears there has been a large increase under the heads of wheat, cotton, gingelly seed, and hides. There has been a falling off in the exports of rape seed, owing to the poorness of the European markets ; there being large stocks both at Kurrachee and up-country, which dealers are reluctant to sell at a loss. It is believed that the exports of wheat will be much larger this month and in December, than in the same months of 1884. According to trustworthy information, there is now in Kurrachee, in the hands of native sellers and exporting firms, fully 1,200,000 cwt. of wheat ; to say nothing of further quantities that may come in from up-country, to complete sales already made.

Selections.

RESEARCHES ON SILK FIBRE.

By THOMAS WARDLE, F.C.S., F.G.S.*

THE Chamber of Commerce of Lyons having done me the honour to request me to conduct an examination of the fibres of the various species and varieties of silk, both those obtained from domesticated worms and wild or semi-wild ones, on the basis of my former researches, partly described in my "Hand-book of the Wild Silks of India," I have, for the past twelve months, given a more thorough examination of these fibres, from cocoons in my own possession, as well as from cocoons furnished to me by the Lyons Chamber, and Monsieur Rondot, an influential member of the Chamber, and ex-president of the silk section of the International Exhibition of Paris, 1878, whose able time and energies are given to the nurture and development of the French silk industry. The President of this important and influential Chamber has, in several letters to me, expressed his high opinion of the value and importance of these continued investigations, the consequence of which is that, at Lyons, a laboratory is being constructed, called Laboratoire de Sericiculture, and an earnest sericiculturist, Monsieur Dusuzeau, has been appointed curator, whose office and work it will be to record the results of examination of the various races of silk, methodically and regularly.

The effect of this annual and scientific work on the silk fibre will be to give, by a closer insight and more extended knowledge, a direction in the better reeling and sizing of silk, both European and Eastern, in the earlier stages of manufacture. The production of a thread of raw silk as regular and uniform as possible, is still a desideratum, particularly in China, where the raws have mostly become very irregular and badly sized, probably through price, competition, and decrease of sufficiently skilled reeling labor. In India, too, there is great need of improvement and renewed stimulus in this respect ; for although much was done years ago to improve the reeling of Bengal silks, the effort has not been continuous enough. Much remains to be done, for I think if India silk could be well reeled generally, it is from that continent we ought to look for a great supply. In the wild silks of India, it is simply the coming want, and the application of improved reeling appliances will mark a new era in the utilisation of tussur and several other species of wild silks, a utilisation which is already one of the most remarkable facts in sericiculture, and which may be said to take its date practically in 1878, when the amelioration and capabilities of these wild silks were first announced and shown by me in the Indian section of Paris Exhibition of that year, under the direct supervision of H.R.H. the Prince of Wales, and of the energetic efforts of Sir Philip Cunliffe Owen, with such success as gained from the jury the highest award—the diploma of honour for the Viceroy of India.

It might be naturally enough supposed that in a continuous thread or bave of silk, as unwound from the cocoon, an absolute regularity of fibre would not be found ; such is indeed the case, and my investigations have had for their objects the recording of these differences throughout the entire length of the cocoon thread, both as to diameter or thickness of fibre, strength, and tension, or elasticity of various species of silk, including the silk of commerce, produced by the *Bombyx mori*, or mulberry-fed worm, also various wild silks, and some spider silks. These points have been recorded at intervals of fifty metres, and the following tables show the results. All species of silkworms have two stores of silk, one on each side of the alimentary canal; and below their mouths they have two so-called spinnarets or orifices, to which I have ventured to give the name of "seripositors," through which the silk issues simultaneously in pairs of fine parallel filaments or fibres, forming in fact a double thread. For all practical purposes I have considered it sufficient, in estimating the tensions, strengths, and diameters, to give those of this double thread; as in reeling the silk from the cocoons into skeins, it is, of course, invariably drawn off in the form of a double thread, although so fine is it as to be apparently one.

The French term for this double thread, is "bave," and each of the single fibres composing it is called "*brin*," which is synonymous with our word "fibre."

The method by which I have reeled the bave or double thread from the cocoons is as follows:—The cocoons were first softened by keeping them immersed for several hours in a dilute aqueous solution of Marseilles soap, which, before it was used, was examined and found to be *free* from any appreciable excess of alkali, and then raising the temperature of this liquid for a few minutes to about 120° F. When the cocoons were soft enough, the short or waste fibres were pulled off the outside of them until the end of the double reelable thread or bave was found This was attached to the machine, a drawing of which is on the table, and the thread reeled, the cocoon remaining floating on the surface of the soap solution in which it was softened until nothing was left, except an unwindable and extremely thin shell of silk immediately surrounding the chrysalis. The machine also registers the length of bave reeled.

I have preferred to examine and to register the two fibres composing the bave conjointly because—

1st. I thus get all the results which would be obtained by examining them singly, as whether the tension is estimated with either a single or a double thread the same mean or average must be obtained, and by finding the average strength and diameter of the double fibre, and dividing these by two, the average strength and diameter of the single fibre can be, of course, easily ascertained.

2nd. I find it somewhat difficult and very tedious to separate the two threads by any convenient solution, and I think there is risk of mechanical injury to the fibres, which would seriously affect the results.

In estimating the tension of the bave, I cannot distinguish that one fibre breaks before the other, but both appear to break at the same time, although the fibres of several species of wild silks being almost flat and joined together in pairs by their edges are not so strongly united as, and separate more easily than, the round fibres of mulberry silk; and in estimating the tension of the bave of these silks, it must of course be first ascertained that the two fibres have not become separated

After each cocoon was reeled into a skein, I began to unwind the double thread from the machine, commencing at the inner end, that is, the end that was nearest the chrysalis, taking the first five metres for examination. I then unwound fifty metres, which I threw away, and took the next five metres for examination; and I went on thus until I arrived within five metres of the other or outer end of the reeled thread, which five metres I always examined, although the length of bave between this and the preceding five metres examined might be less than fifty metres. The bave, or double thread, of each cocoon was therefore tested for its strength, tension, and diameter, at every fifty metres of its length, except at its outer end.

Silk is well known to possess considerable elasticity. I have endeavoured to estimate this elasticity or tension by attaching three decimetres of the bave at a fixed point, on a scale divided into centimetres and millimetres, and then stretching it until it broke, and noting the point on the scale at which the breakage occurred.

The strength of the bave was ascertained by a serimetre, contrived in a homely manner, consisting of a spring balance with a scale divided into drams and eighths of drams avoirdupois. Fifteen centimetres of the bave were attached to the balance arm and gradually pulled until breakage occurred, the points of its occurrence remaining registered on the scale of the balance.

The diameter of the bave was measured under the microscope with a power of 250 diameters, with the aid of an eye-piece micrometre, seven of the divisions on which represented 1/1000 inch.

Between thirty and forty cocoons of different kinds formed the subject of this examination. Amongst the mulberry silks are several breeds or "*races*" from the various silkworm districts of the south of France, several from Japanese and Chinese seed but reared in France and Switzerland, also Italian and Grecian, as well as cocoons from Japan and China. The list also includes the following wild silks:—The Indian *Tussur*, the Chinese *Pernyi*, the Japanese *Yamamai*, as well as *Muga* silk, *Attacus cynthia*, and *Attacus ricini*, and *Lasiocampa otus*. Their peculiarities, structure, and properties are fully described in the tables which follow.

Next in order is arranged a very interesting series of spider silks of the following species:—

1. An Epeirid, *Nephylengis malabarensis* (Watch), an Indian spider sent to me for examination by Professor Thiselton Dyer.

The following five have been sent to me by the eminent authority on spiders, the Rev. O. P. Cambridge, of Bloxworth Rectory, Wareham:—

2. *Nephila plumipes* (Koch), United States, America.
3. Egg cocoons of an Epeirida sp., Adelsburg.
4. Silk from the nest of *Oroctea durandii* (Walck), from Palestine.
5. Egg cocoons of *Meta menardi* (Latr.), Devonshire.
6. Egg cocoons of *V. onia maculata* (Keys), N. Corrientes, La Plata.
7. A supposed spider silk, dyed red in South America, lately sent to me for examination by Messrs. Marshall and French of London.

1. *Three pale yellow Cocoons, race Bione (Drome) Nyons.*

Not very readily reelable, and a rather large quantity of waste on the surface of the cocoon. Internal unreelable shell surrounding the chrysalis extremely slight and transparent. The silk on the outside of the cocoon is almost white, but becomes gradually yellow, as the interior of the cocoon is approached. The most internal part of the reelable fibre is quite bright yellow. Length of cocoon before reeling, $1\frac{1}{8}$ inches. Diameter, $\frac{5}{8}$ inch. Length of double fibre reeled, 265 metres.

The averages of six estimations of the tension of the bave, at each distance tried, throughout the cocoon, were as follows:—The figures represent the number of centimetres which three decimetres of the double fibre will stretch or extend before it breaks:—

Inner end.	At 55 metres.	At 110 metres.	At 165 metres.	At 220 metres.	Outside end.
3·2	3·7	3·3	4·2	3 4	4·7

The averages of six estimations of the strength of the bave or double thread at each distance tried, throughout the cocoon, were as follows:—The figures represent the number of drams avoirdupois which fifteen centimetres of the double fibre will support before breaking.

Inner end.	At 55 metres.	At 110 metres.	At 165 metres.	At 220 metres.	Outside end.
$3\frac{7}{8}$	4 4/8	$5\frac{3}{8}$	4	$4\frac{7}{8}$	$4\frac{7}{8}$

The averages of six estimations of the diameter of the bave or double thread of each distance tried throughout the cocoon were as follows:—The figures represent the diameter in fractions of an inch:—

Inner end.	At 55 metres.	At 110 metres	At 165 metres	At 220 metres	Outside end
$\frac{1}{810}$	$\frac{1}{790}$	$\frac{1}{775}$	$\frac{1}{900}$	$\frac{1}{890}$	$\frac{1}{920}$

2. *White Cocoon, race Japan; Grisons, Suisse; harvest of* 1884.

This cocoon reeled tolerably well, but had on its surface a rather large amount of waste unreelable fibres. The internal unreelable shell of silk surrounding the chrysalis was moderately thin. Length of cocoon before reeling, $1\frac{1}{8}$ inches; width 5 inches. The length of the double fibre reeled was 270 metres.

3. *White Cocoon from Kalamata, Morea, Greece; crop of* 1884.

This cocoon reeled tolerably well, having on its surface a moderate amount of waste unreelable fibres. The internal unreelable shell of silk surrounding the chrysalis was moderately thin. The silk throughout the cocoon was white, like China silk. Length of cocoon before reeling, $1\frac{1}{8}$ inches; width $\frac{5}{8}$ inches. The length of the double fibre reeled was 360 metres.

4 *Green Cocoon from Japan; Grisons, Suisse; crop of* 1884.

This cocoon reeled tolerably well, having on its surface a moderate amount of waste unreelable fibres. The internal unreelable shell of silk surrounding the chrysalis was about the usual thickness of that of mulberry silk cocoons. Length of cocoon before reeling, $1\frac{1}{4}$ inches; width $\frac{5}{8}$ inch. The length of the double fibre reeled was 320 metres.

5. *Cocoon of Mulberry Silk, China.*

This cocoon reeled very easily, having on its surface only a moderate amount of waste unreelable fibres. The external unreelable shell of silk surrounding the chrysalis was very thin and transparent. The silk throughout the cocoon was very white. Length of the cocoon before reeling, $\frac{7}{8}$ inch. Width $\frac{1}{2}$ inch. Length of double fibre reeled, 476 metres.

6. *White Cocoon from Bagdad, Turkey in Asia.*

Reeled tolerably well, having on surface a moderate amount of waste unreelable fibres. Internal unreelable shell of silk surrounding the chrysalis about the usual thickness of that of the mulberry silk cocoon. Length of cocoon before reeling, about $1\frac{3}{8}$ inches. Width $\frac{5}{8}$ inches. Length of double fibre reeled, about 540 metres.

7. *Yellow Cocoon from Ronda, province of Granada, Spain.*

Reeled tolerably well, having on surface a moderate amount of waste unreelable fibres. Internal unreelable shell of silk surrounding the chrysalis about the usual thickness of that of mulberry silk cocoons. Length of cocoon, before reeling, about $1\frac{1}{4}$ inches. Width, 11/16. Length of double fibre reeled, about 335 metres.

8. *White Cocoons from Granada, Spain.*

Reeled very well, having on surface a moderate amount of waste or unreelable fibres, and the internal unreelable shell surrounding the chrysalis about the usual thickness of that of the mulberry silk cocoon. Length of cocoon before reeling, $1\frac{1}{4}$ inches. Width, $\frac{5}{8}$ inch. Length of double fibre reeled, 375 metres.

9. *White Cocoon of Italian-grown Novi.*

Reeled exceedingly well, having on surface a tolerable amount of waste unreelable fibres. Internal unreelable shell of silk surrounding the chrysalis about the usual thickness of that of the mulberry silk cocoons. Length of cocoon before reeling about 1/16 inches. Width, $\frac{5}{8}$ inch. Length of double fibre reeled, about 620 metres.

10. *White bivoltine Cocoons from Japan, bred at Montpellier.*

Easily windable, but a rather large quantity of waste on the surface of cocoons. Internal unreelable shell surrounding chrysalis extremely slight and transparent. Silk throughout cocoon very white. Length of cocoon before reeling 1¼ inches, and diameter ⅝ inch. Length of double fibre reeled, 316 metres.

11. *White Cocoons from Corea, Greece, bred at Montpellier.*

Reeled exceedingly well, having on surface only a very slight amount of waste or unreelable fibres, and the internal unreelable shell surrounding the chrysalis being extremely slight and transparent. Silk throughout the cocoon very white. Silky walls of cocoon considerably thicker than usual, as shown by the greater length of fibre reeled, as well as by section. Length of cocoon before reeling, 1 inch; width, ⅝ inch. Length of double fibre reeled, 479 metres.

12. *Yellow Cocoon of a bivoltine race, from Tonkin.*

Reeled well. Had on surface a moderate amount of waste unreelable fibres; and the internal unreelable shell surrounding the chrysalis about the usual thickness of the mulberry silk cocoons. Length of cocoon before reeling, about 1 7/16 inches. Width 9/16 inch. Length of double fibre reeled, about 200 metres.

13. *Pale yellow Cocoons, from Morestel, France.*

Reeled tolerably well, having on surface a moderate amount of waste unreelable fibres. Internal unreelable shell of silk surrounding the chrysalis about the usual thickness of that of the mulberry silk cocoon. Length of cocoon, before reeling, 1 7/16 inch. Width 11/16 inch. Length of double fibre reeled, about 425 metres.

14. *White Cocoons of a species from Shanghai, China, bred at Monplaisir, Lyons.*

Reeled exceedingly well, having on its surface only a very slight amount of waste or unreelable fibres, and the internal unreelable shell surrounding the chrysalis being extremely slight and transparent. Silk throughout the cocoon very white. Length of cocoon before reeling 1 inch, and diameter about ⅝ inch. Length of the double fibre reeled, 308 metres.

15. *White Cocoon from Valleraugue (Gard), France.*

Reeled exceedingly well, having on its surface only a very slight amount of waste or unreelable fibres and the internal unreelable shell surrounding the chrysalis being extremely slight and transparent. The cocoon, before reeling, 1⅜ inches, and diameter ¾ inch. Length of the double fibre reeled, 640 metres.

16. *Cocoons from Fluang Chioo ts' an silkworm, China; race, domestic and bivoltine.*

The fibres of this cocoon are very regular in diameter, the bave being 1/1175 inch, and the single fibre 1/1750 inch. The silk is light yellow throughout the cocoon.

17. *Pai jsi ts' an. White cocoon, China; race, domestic.*

The bave of this cocoon has an average diameter of 1/825 inch, and the single fibre 1/1650 inch. The diameter varies only within narrow limits throughout the bave.

18. *White Cocoon; race, Sina, bred at Nyons (Drome).*

The bave of this cocoon has an average diameter of 1/715 inch, and the single fibre 1/1430 inch. The diameter varies only within narrow limits throughout the bave.

WILD SILK.

19. *Cocoon of Tussur Silk (Antheræa mylitta), written also Tasar, Tussore, Tussah, Tussar, from Cuttack.*

This cocoon reeled moderately well, but had on its surface a somewhat considerable amount of waste or unreelable fibres, but the internal unreelable shell surrounding the chrysalis was thin and transparent. Silk throughout the cocoon of the usual fawn colour of tussur silk. Length of cocoon (without pedicle) before reeling, 1½ inches. Width, ¾ inches. Length of double fibre reeled, 420 metres.

20. *Cocoon of Antheræa Pernyi, China, the so-called Tussur silk of China.*

This cocoon reeled tolerably well, having on its surface a moderate amount of waste unreelable fibres. The internal unreelable shell of silk surrounding the chrysalis was moderately thin. The silk throughout the cocoon was of the usual fawn colour of tussur and most of the other Indian wild silks. Length of the cocoon before reeling, 1⅝ inches. Width, ⅝ inch. Length of double fibre reeled, 492 metres.

21. *Cocoon of Attacus Ricini, or Eria Silkworm.*

This cocoon was extremely difficult to reel, and had on its surface a considerable amount of waste unreelable fibres. The internal unreelable shell of silk surrounding the chrysalis was moderately thin. The silk throughout the cocoon was white, some cocoons being rust colour. Length of the cocoon before reeling 1½ inches. Width, ⅝ inch. Length of double fibre reeled, 320 metres.

22. *Cocoon of Antheræa Assama, or Muga Silkworm.*

This cocoon reeled tolerably well, having on its surface a moderate amount of waste unreelable fibre. The internal unreelable shell of silk surrounding the chrysalis was moderately thin. The silk throughout the cocoon was the usual fawn colour of tussur and other wild silks of India. Length of the cocoon before reeling 1⅝ inches. Width, ⅞ inch. Length of double fibre reeled, 370 metres.

23. *Cocoon of Antheræa Yama-mai, Japan.*

This cocoon reeled tolerably well, and had on its surface only a moderate amount of waste unreelable fibres. The internal unreelable shell of silk surrounding the chrysalis was thin and transparent. The silk throughout the cocoon is very beautiful and lustrous, being of a light yellowish green colour, whilst the superficial layer of the cocoon is bright green. Length of the cocoon before reeling, 1⅜ inches, Width, 1 inch. Length of double fibre reeled, 480 metres.

24. *Cocoon of Attacus Cynthia, Algeria.*

This cocoon was rather difficult to reel, and had on its surface a somewhat considerable amount of waste or unreelable fibres, and the internal unreelable shell of silk surrounding the chrysalis was not so thin as in the tussur cocoon. Silk throughout the cocoon of the usual fawn colour of tussur and other wild silks. Length of cocoon before reeling, 2 inches. Width at widest part, ¾ inch. Length of double fibre reeled, 260 metres.

25. *Cocoon of Antheræa Frithii.*

This cocoon being pierced by the exit of the moth could not be properly reeled, but I have determined the tension, strength, and diameter of the fibres in two different parts of the cocoon, with the following results:—

	Inner end.	Outside end.
Tension.	7·4	8·8.
Strength.	19	9 4/8.
Diameter.	$\frac{1}{358}$	$\frac{1}{363}$

In this cocoon, the two fibres of which the bave is composed, had a great tendency to separate, and did not adhere together as in mulberry silk cocoons.

26. *Bourre, or waste silk, from two reticulated cocoons of Caligula Faponica. One red, the other light grey.*

These fibres run in pairs. They are flat and united together by their edges. They are not marked with longitudinal striæ, like tussur silk fibres. They have an exceptionally large diameter, the red one measuring 1/330 inch for its single fibre and 1/165 inch for its bave, and the other light grey one 1/310 inch for its single fibre, and 1/155 inch for its bave. These figures show the average diameters, the variations not being unusually great.

27. *Cocoons of Sai yen ts' an; from a new kind of wild silkworm feeding on the mulberry leaf.*

The fibres of these extremely small cocoons are round, run in pairs to form the bave, and have all the essential characters of mulberry silk. They are, however, much finer than the fibres of the silks of commerce, the diameter of the bave being 1/1400 inch, and of the single fibre 1/2800 inch. This diameter is very uniform throughout the cocoons. The colour of the cocoons and silk is very little different from that of tussur.

28. *Lasiocampa otus; 1 cocoon.*

This cocoon was so very much damaged when I received it, that it was impossible to reel it. I have measured the diameter of a few fibres taken from it at random, with the following results. The figures represent the diameters in fractions of an inch:—

$$\frac{1}{2000} \quad \frac{1}{2000} \quad \frac{1}{2000} \quad \frac{1}{2000} \quad \frac{1}{2800} \quad \frac{1}{2800}$$

Average of single fibre, 1/2150; double 1/1075.

The fibres were all white, and the cocoon measured in length 2⅛ inches, and in width, 1⅜ inches.

Before proceeding with the spider-silk, it will be well to mention the outcome of these examinations.

First, as to the tension. It is clearly proved that the tension varies in proportion to the strength and thickness of the bave, being less at the thinner ends of the bave than at the thick middle portions. In the *Bombax mori* silks (the mulberry-fed worm silks), the difference in tension between the thinnest parts and the thickest is, in many cases, 1·0 to 2·0 centimetres, and often more, in three decimetres of the bave, that is, a metre of the thinnest parts of the bave would stretch, say 12·0 centimetres, whilst at the thickest parts it could be extended 15·0 to 18·0 centimetres, or more, before breaking; and the same proportion between tension and thickness obtains throughout the varying tension of the whole of the bave of each cocoon.

The strength, as might be expected, varies in the same proportion as the tension, the thinnest parts of the bave, roughly speaking, breaking with a weight of 3 to 5 drams, and the thickest parts, with a weight of 5 to 8 drams.

Coming to the most important feature of the bave, it will be interesting to show in which way the thread varies in size or thickness, or, as I have previously termed it, diameter. The transverse section of the thinnest parts of the bave (the double thread be it remembered), again speaking roughly, measures 1/900 inch to 1/1000 inch, whilst at the thickest parts its measurement is 1/700 inch to 1/800 inch. The six or eight trials along the entire length of the cocoon thread, as a general rule, show a gradually increasing thickness from each end of the cocoon towards the middle, where it is thickest, in some instances by as much as a third. I consider the exceptions to be accidental, and in no way invalidating the theory and discovered fact.

In the diameter of the bave, it is noticeable, that towards each end of it the disproportion in diameter of the two fibres composing it becomes gradually greater, so that often at the beginning or end of the cocoon one fibre or brin is much thicker than the others.

Now, it will be asked, what is the practical outcome for all this? First, a silken thread or fabric is best when equally strong and also when equally thick or equally thin. As it is always the practice in reeling cocoons to reel, say, four or more cocoon threads together, it is manifestly impossible to reel an even filature or thread of raw silk if the cocoons are all commenced at the same time, or if cocoons are taken varying much in the sizes of their threads.

This investigation tends to instruct those engaged in reeling the cocoons by clearly showing where the inequalities are, and at the same time to guide them in greater niceties of manipulation, so as to secure as even and perfect a result as possible.

Where the bave differs so much in thickness as one-third, it is impossible to expect an even thread to be constructed by rule of thumb, and I am glad to say that the Chamber of Commerce at Lyons places very high value on these examinations.

Greater attention is paid to this already in Italy, France and Broussa, than, perhaps, elsewhere; although much of the Japanese silk is excellently reeled. I have here a sample of Bengal silk, which has been lent to me by a Leek manufacturer of sewing silks, which he states is so beautifully reeled as to produce silk thread for the sewing-machine, of perfect regularity and strength; but for some time great complaints have been rife as to the unequal reeling, and consequently unequal sizing of China silks. It is impossible to construct delicate fabrics in the loom, where evenness is required, unless the silk is well sized.

The same may be said to a certain extent of the wild silks, but there are somewhat greater irregularities throughout the length of the cocoon in these silks than in the domesticated breeds. In Eria silk, the thickening of the fibres towards the centre of the cocoon is particularly noticeable, in tussur silk, less so; but as only one cocoon has been examined, I do not insist that this exception s constant

There is no doubt that it is not difficult now to reel tussur silk into very regular even threads. In 1876 I went to Italy, at the instance of the Government of India, to see if it were possible to make a good thread out of tussur cocoons. I was perfectly successful, and the results may be seen at the India section of the South Kensington Museum, and will be found amply described in my "Hand-book of the Wild Silks of India." Since that time a number of colaborateurs in India and China have been confirming these results. One gentleman in India, who has availed himself of the best European reeling appliances has for some time regularly sent me samples of raw silk of his reeling which have gradually become more and more satisfactory He now writes saying that there is nothing left to be desired, except to wait for more skill on the part of his young silk-workers; his observation is fully borne out in the opinions of several English silk manufacturers to whom I have submitted his results.

The characteristic glittering appearance of tussur silk when dyed, especially in black, is most probably owing to the fibres being flattish, and the bave becoming separated into its ultimate fibres more easily than in mulberry silk, thus giving play to greater reflection of light.

Owing to the extreme difficulty of obtaining transverse sections of the fibre of silk sufficiently thin, I have not yet been able to complete my investigations on its absolute structure, either in the undyed or dyed state. I am at present engaged on this, and hope before long to be able to describe the appearances, under the highest powers, of sections which must be as thin as, at least 1/4000 inch, in order that they may lie flat on the side. The importance of this inquiry will be understood, when I state that to such an extent has the falsification of silk arrived by weighting with chemical matter, that in many fabrics the bulk is increased to as much as eight times the original bulk of the fibre. It will also be useful if we can get at a clearer idea as to how tinctorial matter, with and without mordants, permeates or penetrates the silk fibre as well as to the action of certain matters with which silk has a peculiar affinity, as for example, tannic acid, salts of tin, iron, chromium, &c.

SPIDER-SILK.

I come now to a short consideration of spider-silk. As is so well-known, spiders are great producers of this fibre, both for their webs and nests.

As the examination of spider-silk is comparatively new to me, I have not had time to make a very minute investigation of it, but it will form the basis of future interesting work.

Professor Thiselton Dyer, some time ago, was good enough to ask me to investigate some spider-silk which a correspondent, Mr. Duthie, had sent to him from India, and in describing this, I, think I cannot do better than read first the letter which Professor Dyer received from Mr. Duthie. The letter is dated, "Botanical Gardens, Saharunpur, November 25th, 1884," and is as follows:—

"By to-day's mail I am sending you some queer-looking stuff—spider-silk. It was extremely lovely as I saw it when coming down from Almora the other day. Enormous webs of it stretched between the trees and shrubs overhanging the lake at Bhim Tal in Kumaon. I saw a notice a short time ago, in some paper, regarding the use which might be made of these string webs. A particular kind, of a golden yellow colour, occurring in New Zealand, was specially recommended, and in fact it had been manipulated with success as a substitute for silk. What I saw at Bhim Tal answers very much to the description of the New Zealand kind, and if a supply is wanted for an experiment on a large scale, it could easily be obtained from this locality, after the rainy season is over. In a small tin-box enclosed in the packet I am now sending are a few of the spiders, not in very good order, but I had to send for them."

Professor Dyer, called in the learned aid of the Rev. O. P. Cambridge, of Bloxworth Rectory, Wareham, relative to the natural history part of the subject, and, as the letter is very interesting, I do not think it will be considered out of place here. He says:—

"The spiders are broken, shrivelled, and crushed out of all recognition almost. The genus, however, is clear enough, and I have no hesitation in pronouncing them to be (an Epeirid) *Nephilengys malabarensis*, Walck. Walckenaer described it as an Epeira. I described it also some years ago from the China Sea and the Congo and other parts of the West African coast (supposing it to be new), as *Nephila reculata*. Subsequently, L. Koch separated it from *Nephila*, under its present (good) generic name *Nephilengys*. It seems to be almost cosmopolitan; it has been described under another name, from Amboina, by Doleschall, and under another again, by L. Koch as well as twice, under different names, by Walckenaer. I have it from the China seas and India, as well as from Australia, Borneo, and West Africa, and I think (though I cannot at this moment refer to my collection and books) from other regions as well. It appears to be exceedingly abundant in all its localities. The silk (which is new to me) is very strong and tough, and I should imagine that the fabric which might be made from it would be almost imperishable. Whether it could be spun out from silk collected *en masse* from the spider's snares, I should doubt. I fancy the only way to get the silk in condition for spinning and weaving, would be after some such method as Dr. B. G. Wilder proposed, and experimented upon (I believe) successfully, some years ago, in North America. But the great drawback will always remain, that spiders devour each other, and so cannot be fed, or their silk obtained, without great trouble and cost."

After carefully examining this spider-silk, I made the following report:—

"The fibre is evidently of a silken nature, and, like silk, it is loaded with a gummy substance. In a boiling soap solution, this gum, or varnish, dissolves leaving the fibre apparently pure, and of the nature of fibroin, if not identical with it.

"Eight micrometric measurements of the diameter of the fibre in different parts of the mass showed great irregularity in diameter (1/2300, 1/2800, 1/3500, 1/2800, 1/3500, 1/3500, 1/3500, 1/3500) giving an average of 1/3160 inch. It is, therefore, a considerably finer fibre "or brin" than silk, the brin of Italian silk being not finer than 1/2100 inch.

"The average strength of the spider-silk is proportionately greater than that of silk, a single fibre of the spider-silk breaking with an average weight of 2¼ drams avoirdupois, whilst that of China silk, so much thicker, breaks at 2 to 3 drams.

"The most curious property of this fibre is its elasticity, which is considerably greater than that of silk; 30 centimetres of it will stretch to an average length of 36·6 centimetres before breaking, whilst China silk will only stretch to 34 or 35 centimetres.

"Like silk, this spider's web-silk is lustrous, and has a round fibre.

"Its coating of gum or varnish is disproportionate to the weight of the silk. On boiling with soap it lost weight at the rate of 7¾ ozs. per lb. advoirdupois, that is 1 lb. of the spider silk discharged 7¾ ozs of gum. In the silk of the *Bombyx more* worm the proportion is much less, the gum seldom being over 25 to 30 per cent of the total weight. Before boiling in soap the spider-silk was well combed to remove all the dirt possible, but a little remained.

"The fibre appears to receive tinctorial matter readily. I enclose a small pattern of it dyed, and also one as I received it, and one after boiling in soap.

I believe, if it can be obtained in quantity, it might be packed in bales and sent to England, where it would readily find a market for being carded and spun into spun silk threads for sewing or weaving purposes.

"It is difficult to estimate its marketable value. I dare say it would at any rate realise 1s. to 2s. per lb. It is rather dirty, and this would to some extent detract from its value as compared with silk waste.

"I have tried to discover how many seripositors this spider has, but beyond noticing, under the microscope, that the fibres often run in pairs, but not regularly, I am unable to trace whether there are two, as in the ordinary silkworms, or more. Probably an examination of the spider would show this, or of an undisturbed portion of its secreted silk."

Mr. Cambridge has been kind enough to send me five other species of spider-silks. I have not been able to do more than to examine the diameters of their fibres, which are as follows:—

	Diameters of ultimate fibres.
Egg cocoons of an *Epeirida sp.*	1/7000 inch.
Egg cocoons of *Meta menardi*, Latr. Devonshire ...	1/4000 inch.
Nest of *Uroctea Durandii*, Walk, Palestine ...	1/8000 inch.
Silk of *Nephila Plumipes*, Koch, United States, America	1/2150 inch.
Egg cocoons of *Voconia maculata*, Kaye N. Corrientes, La Plata	1/14000 inch.

The small specimens of spider-silks are on the table, and, along with that of the *Nephila plumipes*, is a small portion of ribbon made with its silk for the warp, and with cotton a weft.

There does not seem to be much prospect of any successful reeling of any of the species of spider-silk, but it is quite within the limits of possibility that they may be produced in such quantity as to be useful for being carded and spun, and if so, there will no doubt be a considerable utilisation of them.

Short of a thorough analysis of the spider-silks, which I have not yet had opportunities of making, it seems to possess to all appearance, all the physical properties of mulberry silk. It certainly has a central axis of silky matter probably fibroin, and also an external coating of "gum," or "gres," or varnish, like silk, probably to protect it from the action of the weather.

Dr. Bowman, in his first lecture on "The Structure of the Wool Fibre," at the Bradford Society of Dyers and Colourists, on January 22nd 1885, states that silk fibre consists of three parts—a central silk cylinder forming the principal part of the fibre, outside this, is a layer of albumen, and on the surface of this, a thin coat of gelatine. I have not been able to confirm this, and cannot go beyond my observations, which at present limit my conclusions to there being only a central substance of fibroin, coated with what is technically termed in England "gum" and in France "gres," the gum constituting from 25 to 30 per cent of the original weight of the silk, and being entirely removeable, by the necessary operation before dyeing, of boiling the silk in a solution of soap.

In the case of the mulberry silks, the fibres seem structureless, having the appearance of a glass rod, and, like glass, have a more or less conchoidal fracture when broken. Wild silks differ from this in structure very much. In almost all of them, each fibre seems to consist of minute fibrets, and under the microscope appear numbers of thin, longitudinal striations throughout the length of the fibre. In the case of tussur silk, I have been able to separate these fibrets, as you will presently notice on the screen.

I ought here to mention two properties of silk which have to do somewhat with structure and practical manipulations.

First, silk is more or less affected by water, and always holds in what Dr. Bowman calls a state of water of hydration, containing more in damp weather and less in dry weather. At the Lyons conditioning-house, silks sent to be conditioned are made absolutely dry at a high temperature in suitably constructed vessels. They are then weighed, and 11 per cent is added to the dried weight for water of hydration or natural moisture. During the last twenty years I have made an enormous number of trials of this hygrometric property of silk, and I have found that when silk, having been divested of its natural gum and dried at a temperature not exceeding 150° Fahr., is exposed to the air, it gains in weight from 5 to 10 drams per boiled-off silk-lb., or from 2 to 4 per cent. This shows also that a much higher temperature is required to drive off all the water of hydration.

Second, the electric properties of silk are remarkable. Silk is a most perfect non-conductor of electricity when dry, and it is amusing to see how loose dry silk fibres start up in *chevaux de frise* fashion when excited by friction. This property seriously interferes with the manipulation of silk in various stages of its manufacture when it becomes too dry. In some manipulations it has to be kept moist by artificially applied means, such as glycerine, &c. It will be seen from this how much more suitable our colder and moister English climate is for silk manufacture. than hotter and drier ones.

With regard to the chemical composition of silk, there is a little perplexity. Probably the most satisfactory examination yet made, is the following, by Mr. Schorlemmer :—

"When raw silk is heated in water under pressure, it yields two compounds.

"Fibroin, $C_{15} H_{23} N_5 O_6$, constitutes about 66 per cent of raw silk ; it is a silky, glistening substance, which is insoluble in water, but dissolves in strong acids, alkalies, and a solution of cuprammonium sulphate. When boiled with dilute sulphuric acid, it yields glycocoll, leucine and tyrosine.

"Sericin or silk-gelatin, $C_{15} H_{25} N_5 O_8$, is a substance resembling gelatin. Its hot aqueous solution is precipitated by alcohol, and after drying, the precipitate forms a colourless powder, which in cold water swells up to a gelatinous mass. On boiling it with dilute sulphuric acid, it yields a small quantity of leucine, and larger quantities of tyrosine and serine, or amidoglyceric acid."

Dr. Bowman, in his most excellent lectures on wool fibre, gives some interesting facts in his third paper on wool fibre, from which I will quote, and it will be interesting also to give the composition of cotton and wool fibres for comparison.

Perfectly pure cotton is identical with pure cellulose, which is represented by the formula given in the following table, where the formula for silk is contrasted with those for wool and cotton :—

Cotton	$C_6 H_{10} O_5$
Silk	$C_{24} H_{38} N_8 O_8$
Wool	$C_4 H_{157} SO_{15}$

The important additional element of nitrogen in silk and wool will be observed, as well as wool standing alone in containing sulphur.

I hardly think that this is the right way oft stating the formulæ for silk. I am inclined to doubt their accuracy, for it is not quite clear that silk is purely an organic substance. If pure silk is fibroin, its formula would be as stated by Mr. Schorlemmer, $C_{15} H_{23} N_5 O_6$; but if the composition to be described is that of the fibroin, sericin, albumen and gelatin contained in silk as it exudes from the silk-worm, it can hardly be formulated as a distinct chemical compound.

I may here state, in passing, that Dr. Wanklyn's admirable ammonia process for estimating the amount of organic matter in water, is applicable for determining the exact amount of silk when in combination with weighting matter. I am at present at work on this, and as soon as the results are worked out, I intend that they shall form the substance of another paper in connection with details concerning the *modus operandi* of silk weighting, now so very largely practised on the Continent of Europe, and to a certain but more limited extent, I am sorry to say, in England, where in recent degenerate days foreign competition in price has rendered it more or less imperative. It will be of the highest importance to describe a method by which chemists can at once, with certainty, determine the exact amount of sophistication in any so-called silk fabric.

Is not the time arrived when the British consumer should know by the compulsory declaration of the amount of weight or adulteration what he is really buying ! I think so.

I also give from Dr. Bowman's lecture the composition of wool, and also of horny tissue, which it resembles very closely :—

Average Composition of Horny Tissue, according to Mulder.

	Per cent.
Carbon	50·54
Hydrogen	6·91
Nitrogen	16·83
Oxygen	22·27
Sulphur	3·65
	100·00

Composition of Wool.

	Scherer.	Mulder.
Carbon	50·65	50·5
Hydrogen	7·03	6·8
Nitrogen	17·71	16·8
Oxygen	24·61	20·5
Sulphur	0·00	5·4
	10·000	100·0

Dr. Bowman found that, after drying, a number of samples of wool at about 100° F., and then exposing them to the air in an ordinary warehouse unheated in any way, but with a temperature of about 50° F. to 60° F., there was an average gain of 8·28 per cent of moisture, which he terms the water of hydration. He also says—

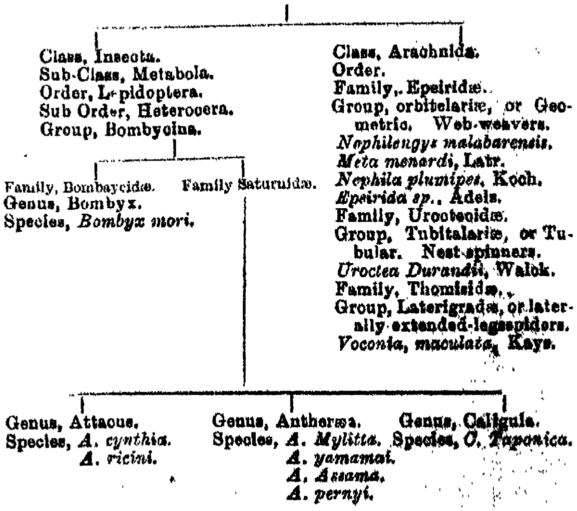
"That on the Continent there are official and public testing establishments in many of the large manufacturing centres, both in France and Germany, where reports can be obtained in regard to the condition both of wool tops and yarn, and that it has been found, by a number of experiments conducted in these places, that if wool is subjected to the highest temperature which it can sustain without scorching, it will regain from 18 to 18½ per cent of moisture, and that we may therefore regard this as its normal condition under the usual atmospheric conditions.

"The above analyses are analyses of the residual or pure wool after the fat, sweaty matter and yolk or suint have been removed by treatment with hydrochloric acid, anhydrous ether, cold water, and alcohol in succession, and then again exhausted with alcohol and ether. The quantity of these foreign substances amounts to from 20 to 50 per cent in air-dried wool." *

The following table will show the position in the animal kingdom of the silk-worms and spiders which have produced the silk described in this paper :—

DIVISION III.—ARTICULATA.

SUB-DIVISION II.—Anthropoda (or true articulata).



Class, Insecta.
Sub-Class, Metabola.
Order, Lepidoptera.
Sub Order, Heterocera.
Group, Bombycina.

Family, Bombaycidæ.
Genus, Bombyx.
Species, *Bombyx mori.*

Family Saturnidæ.

Genus, Attacus.
Species, *A. cynthia.*
A. ricini.

Genus, Antheræa.
Species, *A. Mylitta.*
A. yamamai.
A. Assama.
A. pernyi.

Genus, Caligula.
Species, *C. Japonica.*

Class, Arachnida.
Order.
Family, Epeiridæ.
Group, orbitelariæ, or Geometric. Web-weavers.
Nephilengys malabarensis.
Meta menardi, Latr.
Nephila plumipes, Koch.
Epeirida sp., Adels.
Family, Urocteoidæ.
Group, Tubitalariæ, or Tubular. Nest-spinners.
Uroctea Durandii, Walck.
Family, Thomisidæ.
Group, Laterigradæ, or laterally extended-legs-spiders.
Voconia, maculata, Kays.

COMMERCIAL ASPECTS OF THE SILK INDUSTRY.

The necessity for the minutest inquiry into every detail concerning the economy and excellence of manufacturing silk, cannot be over-estimated. The fact of the Lyons Chamber of Commerce, at this late period of the history of so successful a silk industry as theirs, commencing to build a laboratory for more minute investigation, proves it.

Our attention is almost compulsorily arrested by the fact of the decadence of this industry in our own country, a decadence threatened by extinction, gradual but sure.

A few useful figures from the Board of Trade returns of the value of the imports into the United Kingdom, and of the exports of British and Irish produce from 1854 to 1880, ordered by the House of Commons to be printed in 1882, most seriously shows this. I will only give the totals of various kinds of silk goods manufactured by countries in Europe during two decades, and purchased by England.

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* Dr. Bowman's Lecture on Wool Fibre at the Bradford Society of Dyers and Colourists, April, 1885.

IMPORTS OF SILK MANUFACTURES FROM THE CONTINENT OF EUROPE, DECADE 1854 TO 1863.

	£
Broad stuff, silk and satin	13,679,321
Broad stuff, velvet	1,382,870
Ribbons of silk and satin and other kinds ...	14,175,544
Plush for making hats...	1,023,748
Other kinds of unenumerated manufactures, all silk, and silk mixed with other materials ...	3,470,852
Total ...	33,732,335

DECADE 1874 TO 1883

	£
Broad stuffs, silk and satin	63,868,365
*Broad stuffs, velvet	8 456,076
Ribbons of silk, satin, and other kinds ...	18,919,378
Plush for making hats	237,193
Other kinds of unenumerated manufactures of all silk, and silk mixed with other materials	26,829,560
Total ...	118,310,572

In 1855, our total imports of manufactured silk from countries in Europe amounted to a value of £1,826,525.

In 1880, the total imports of manufactured silk from countries in Europe had grown gradually year by year in value to £13,085,083.

Thus in 25 years we had come to buy from countries in Europe of articles we ought to have manufactured for ourselves no less than £11,258,558, an almost incredible sum.

Did we *lose* this industry, or was it only a surplus to our then established silk industry? The distressed state to day of Coventry, Congleton, Macclesfield, and Spitalfields, and the Manchester silk districts, answers this question too painfully. The trade is gone practically, and gone from us to more skilled and persevering centres abroad, and gone, too, from our own country, which possesses the most suitable climate in the world for the silk manufacturing operations of winding, throwing, dyeing, warping, and weaving.

The valuable reports of the Royal Commission on Technical Instruction, of which Commission my friend, Mr. Woodall, M. P., who has done me the honour to preside this evening, is a most hard-working member, not only fully shows how large an industry there is abroad, but insists that it is only by equal technical skill and increased art-knowledge that our old silk trade can be re-won.

The breeding of silkworms has for a long time been a most important industry in Italy and the south of France. The total production of cocoons from these worms in Italy amounted, in 1881, to 89,300 tons and in 1880 to 40,930 tons in France in 1881 the production of cocoons amounted to 20,362,179=9,090 tons, and were principally raised in the Departments Gard, Ardeche, Drome, Vauclause, Var, and by the mouths of the Rhone. French statistics show that from this a large quantity of French cocoons was produced, in 1881 :—

	Raw silk.		
	lbs.		tons.
France	1,650,000	or	737
Italy	6,523,000	,,	2,912
Corsica and Algeria	6,182	,,	3
Austrian Hungary	324,632	,,	145
Spain and Portugal	184,800	,,	82
Total product in West Europe ...	8,688,614	,,	3,879
From the Levant :—			
Turkey :—			
Anatolia	158,400	,,	71
Salonica, Volo, Adrianople ...	264,000	,,	118
Syria	365,200	,,	163
Greece	28,600	,,	13
Persia and Georgia	550,000	,,	246
	1,366,200	,,	611

It will be seen from these figures what a very important matter it is that the greatest attention should be paid to the earlier operations in the manufacture of silk threads, and one cannot be surprised at the Lyons Chamber of Commerce starting anew to ascertain all the facts relative to the proper sizing, *i. e.*, producing even threads of silk in a more minute and exact manner than heretofore. For if the earlier stages and operations have not for their aim and effect the production of an even thread, no after-manipulation of winding, warping, dyeing, weaving, or finishing can effectually avail in turning out fabrics of the finest qualities, in all or any of the various purposes for which silk is used. Hitherto the sizing has been by rule of thumb, and dependent on skilled eyesight and fingers, in first sorting cocoons and afterwards reeling 4, 6, 8, or more together, according to the required thickness of thread or what at this stage is termed raw silk, that is the state in which it comes into the market before it is manufactured into organzine, tram singles, &c. An examination of the thickness of the ultimate fibre must then take first place, and this method has now commenced, and will be caried on in the new Lyons Laboratory not only of all species and varieties, or, as the French call them, races, of cocoons, but of the thickness of these fibres throughout the entire length of the cocoons, which I have discovered to be very variable. Next come the important examinations of strength and tension, or elasticity, which the foregoing tables illustrate in both the silks of domesticated and of wild worms.

The necessity for examinations such as these is more apparent in the manufacture of those silks which, some years ago, I ventured to designate by the name wild. For some of the wild silks of India for example, there is a great future, a prediction warranted by the successful employment of the wild silks, Tussur—or as it is termed in its vernacular. Tasar—during the last seven years. It would not be right to omit here the mention of the name of Sir George Birdwood, C. S. I., M. D., in connection with Tussur Silk.

In my South Kensington Museum "Hand-book of the Wild Silks of India," I quoted a paper which he wrote in India, as long since as 1859, in which he advocates the desirablity of an attempt being made in England to utilise Tussur silk, a suggestion which he has lived to see now abundantly realised

The extent to which the consumption of Tussur silk in Europe has reached is very large. France imported, from one port alone, last year, 8,000 bales of raw Tussur silk. Several English manufactures have thrown during last year large quantities, as high, in one instance, as 1,000 bales. The whole of these recently increased imports may be said to be badly reeled from the cocoon, *much of it very badly reeled indeed, causing the European manufacturers to cry out loudly for improved reeling in the Eastern centre of production.* Already has the improvement begun, and to such an extent has it been proved practicable by one of my many correspondents and collaborateurs in the East, that raw Tussur is produced from a single bave only—that is, so delicate in the improved reeling, that the beautiful raw Tussur you see here is simply the double fibre from a single cocoon reeled into a single thread successfully, proving conclusively enough that in this, as in other species of silk, if the quality of the raw silk put in the market is defective in any way it is not the fault of the silkworm, which always does its work with the precision that the honey bee builds her cell, but rather the hitherto inadequacy of perception of man to ascertain and adjust the natural variations and differences of the fibre of so wondrous a beauty, and so incomprehensible a product.

If this contribution to a more exact understanding of silk fibre shall serve in however small a degree to stimulate any persons in the direction towards the recovery of our almost lost industry, my object and aim will be fully served.

My acknowledgments are due to my assistants, Mr. T. Rigby, and to my son Bernard, for their care and help in the examination of silk fibre for this paper.

I am indebted to Messrs. Bullock and Sons, silk merchants of London and Macclesfield, for the various specimens of raw silk lent for exhibition.

POISON MILK AND ITS CAUSES.

THE following article on this subject appears in the *Congregationalist* of Boston Mass. It applies directly to the United States, as the reference to "green (Indian) corn" shows; *but what the writer describes is as much an evil in this country as across the* Atlantic :—

The Romans exposed their superfluous children in the Lupercal, and thus made summary work with them. We take ours through longer and more refined torture, but succeed in destroying many of them before the age of five. It may be questioned which indicates the greater barbarism.

One of the most potent instruments in this destruction has for some reason received little attention—the feeding of green, succulent food to cows. Every dairyman is familiar with the laxative effects of green corn, &c, upon his cows. Now no principle is better established than that the animal excretions go very largely into the milk; how quick, for instance, a feed of turnips will produce its effects. Hence it might be expected that, if the cow be purged, the babe fed upon her milk will be; and that this is actually the case, and in a dangerous degree, and any one can satisfy himself by a very few experiments. It will be found, I think, that a single feed of green corn, the "trimmings" of a dinner of green vegetables, or anything of a like nature, will at once produce harmful effects on the child.

I tried this carefully a few years ago, feeding very cautiously and keeping the thing from the knowledge of the mother; but every time the green food was fed, be it a single foddering of green corn, a few pea pods, or the trimmings from a few summer squashes the ever watchful mother would attack me with, "What has the cow been eating lately?" One night the cow got into the corn and ate quite heartily, and the children were made sick for a week, the youngest seriously so. *It is well known that the change of the cows from dry pasture to succulent clover of "fall feed" will produce for a few days the same effects, but the cows soon get used to it and resume their wonted condition.* Thinking the same result would occur with the children, I kept up the cautious experiment for some time, till it became plain that if I did not give it up the children would, when a change was made with entirely satisfactory results.

The season is at hand. Corn fodder and similar foods are to be given to all the cows in the greatest profusion, to keep up the utmost possible flow of milk, regardless of quality or effects. And the consequent diarrhœas and dysenteries will begin to carry off the bottle-fed infants by thousands. There is no reason why a babe should not be reared perfectly well on artificial foods, only great care must be taken, especially with the cow. A whole-souled milkman of my acquaintance, whenever he "has a baby on his hands," as he terms it, takes a good cow from the green fodder and feeds her upon dry food alone, and then keeps that milk carefully for the babe. So much he learned to do by his experience and he deserves a medal; but how many such milkmen are there?

A little inquiry will show any one that this is a matter of serious import, deserving investigation, if not a crusade. Those having a family cow of their own (as every family should when possible), can usually avoid trouble by wilting the green food well for two or three days; but, of course, the milkmen will not do this, as it costs labour and seriously diminishes the flow of milk. In the larger places there would seem to be no alternative but to encourage certain milkmen to make a speciality of furnishing milk for babies, and then guard the purity of such milk by stringent laws and rigid inspection.

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* The velvets for 1883 are included with broad stuffs of silk and satin.

In this connection the silo must not to be forgotten. Every one knows the effect upon the child of alcohol drank by the mother. Now, with all its desirable qualities, the silo has this, also, that it is an alcohol or acetic acid producer of the most villainous sort. The effects, then, of silo-fed milk upon young children cannot fail to be dangerous to the last degree, and no mother should use it who does not wish to run serious risks. It will not be long before the physicians will begin to sound the alarm on this point, as indeed some of the more vigilant have already done. In these days of societies for the prevention of cruelty to animals and cruelty to children, of praying crusades and C. T. U's, why is there not some one to stir a woman's crusade in behalf of our half-million of little ones every year in these wicked ways needlessly slaughtered?

THE SOILING OF DAIRY STOCK.

In a paper read before a recent meeting of the Liverpool (England) Veterinary Association on the above subject, the writer sums up the advantages of the soiling system in the following condensed form:

1. Increased production of milk.
2. Superior quality of milk.
3. Better condition of animals as compared with those grazed.
4. Economy in consumption of food.
5. Great saving of land.
6. Waste land now occupied by fences, materially dispensed with.
7. Increase in the quantity and improvement in the quality of manure.
8. Value of land produce increased.
9. Protection afforded stock against various forms of disease, infectious and non infectious, and parasitic invasion.

He then enlarges upon each of the above heads to prove the correctness of the positions, but space will not permit our publishing his article entire. That upon the first head, briefly summarized, is to the effect that in pasturage the cow expends a considerable amount of physical energy in travelling over the pasture in search of food, when if the food was brought to her, she would only take such exercise as the calls of nature demand, and would spend the rest of the time in quiet rumination, and the energies otherwise taxed in gathering her food would be expended in the secretion of milk. He estimates that the production of a herd of cows under soiling is one-third greater than if on pasture. He claims that the same conditions which increase the quantity of milk, also improve its quality. Soiling is being more and more adopted by American dairymen, especially where lands have become valuable. One of the strongest advocates of the system in the west is Hon'ble Hiram Smith, of Sheboygan Falls, Wis., who claims that the dairyman by this system can double the cow keeping capacity of the farm. In the east where much of the area of the farms is rough broken land, suited only for pasturage and where the tillable area is needed for meadow and grain, pasturage must continue the rule. But on the prairie farms of the west there are no natural obstacles to its adoption by any farmer who may see it for his advantage to do so, either wholly or in part. We have five crops which will supply all the material needed, and furnish ensilage for a continuation of the feeding of succulent fodder during the winter; these are winter rye, clover, oats, millet and fodder corn, which will be in condition for feeding in the order named, carrying the dairyman through the entire summer without any break in the supply of green food required for his stock. They all make good ensilage, and any supplies not required for summer feeding can be so utilized or cured for dry fodder. Where soiling is intended next season, the rye should be sown this month so as to get a good start before winter. The subject presents to the western dairyman this problem to work out: Will the increased product from the increased amount of dairy stock which the farm will carry under the system of soiling, including the increased quantity and improved quality of manure saved, pay the extra labour required, and leave a profit above what would be realized from pasturage? Each dairyman must answer this question for himself from the knowledge he has of his own conditions and environments. Our own belief is that wherever farms have reached a value of $40 per acre the answer will be in the affirmative. One thing not involving immediate profits should not be lost sight of: The increased amount of stock that can be carried under the soiling system will steadily improve the fertility of the farm so that year by year heavier crops can be grown upon it, thereby increasing its actual value either for use or sale.—*Farmers' Review*

Holloway's Ointment and Pills are the best, the cheapest, and the most popular remedies. At all seasons, under all circumstances, they may be used with safety and with the certainty of doing good. Eruptions, rashes and all descriptions of skin diseases, sores, ulcerations and burns, are presently benefitted and ultimately cured by these healing, soothing and purifying medicaments. The Ointment rubbed upon the abdomen, checks all tendency to irritation of the bowels, and averts dysentery and other disorders of the intestines. Pimples, blotches, inflammations of the skin, muscular pains, neuralgic affections, and enlarged glands can be effectively overcome by using Holloway's remedies according to the "instruction" accompanying each packet.

FACTS AND FIGURES.

[From *Kuhlow's*.]

England consumes in a year 54,452,255,000 feet of gas.

It is said that thirty thousand hands are employed in the manufacture of roller skates.

Four thousand suits are said to have been begun in New York on charges of selling adulterated milk.

The maize harvest of the ten principal States in the west of America will this year be quite 1,436,236,000 bushels or 185,840,000 bushels more than last year.

In 1860 the United States had 141 cities and towns of over 8,000 inhabitants, and now there are 286 of such cities and towns. Then the total population of her cities was 5,000,000; now it is about 12,000,000.

The districts producing coal and lignite in Austria may be ranged in the following order: Bohemia, 73 per cent; Styria, 19 per cent; Upper Austria; 3 per cent; Moravia, 1 per cent; Karain, 1 per cent; Corinthia, 0·9 per cent and Istria, 0·6 per cent.

The woollen industry of the United States employed 60,000 persons in 1880, and now 160,000, while the home mills, which produced goods of the value of $30,000,000 in 1880, now turn out an annual product worth $270,000,000.

During the past season 62,000,000 lb. of tea were exported from Hankow and Shanghai, 34,000,000 lb. from Foochow, and 13,000,000 lb. from Canton, or 109,000,000 lb. altogether, against 111,000,000 lb. in 1884.

There were 6,004 failures for 74,722,355 dollars in the United States and 690 for 5,166,165 dollars in Canada during the first half of this year, against 5,510 and 752 failures respectively, and 124,391,282 dollars and 10,742,600 dollars respectively during the same period of 1884.

Fine ribbed stockings were made by machinery in England as early as 1755.

French Railways annually kill one passenger in every 2,000,000 carried; English railways, one in every 21,500,000.

A manufacturer of Breslau has built a chimney 6 metres high entirely of layers of compressed paper, jointed with cement.

The annual oyster trade of New York amounts in round numbers to 5,000,000 bushels.

Fifty thousand letters are said to be sent daily to the United States President, who requires ten thousand clerks.

An enormous supply of copper from the Lake regions of the United States is said to be assured for the next 75 years.

There are somewhat over 220 furnaces in blast in the United States, the greater part of the furnaces being at present out of blast.

There is a talk in Cleveland of a process of making iron more directly from the ore than has hitherto been done, and thus considerably cheapening the product.

A steamer which arrived at San Francisco recently brought nearly one hundred thousand seal skins, valued at over a million dollars.

There is a well of natural gas at Murrysville, Pa., that has been flowing for ten years, and it is said there is no diminution of pressure, though as good a well has been struck within thirty feet of it.

A mass of granite estimated to weigh at least 500,000 tons was displaced recently on the line of the Iron Mountain Railroad, in Missouri, by a single blast in which 5 tons of powder were used.

The throne of the Empress of Russia is completely covered with plates of gold, and contains 1,500 rubies and 8 000 turquoises, besides many other rare and costly gems. The throne of the Czar, known as the diamond throne, is truly a marvel.

TUBERCULOSIS IN CATTLE.

Sir,—I have been accused for quibbling, and if I have, I am sure nothing was ever further from my intentions. The subject is too serious a one for either that or writing for mere argument's sake. It will be observed that Professor Walley wavers, and cannot withstand the artillery of common sense logic; he resigns one of his strongholds, and now waives the slaying of cattle on strong presumptive evidence. This point cannot be too strongly emphasised, for if a professional man was to order the slaughter of an animal worth, say, £500 or £600, and on a *post-mortem* exploration find no tubercle, where would the compensation come from? Besides, would he not find himself in a very awkward predicament as to the curability of consumption? I consider no disease that we generally meet with incurable at a certain stage; it is only us that have not arrived at the knowledge how to apply the means properly as to the malady under consideration. I shall not be so egotistical as to say what share I consider I may have had in the cure of animals entrusted to my treatment, but shall content myself by showing that the disease is considered curable. Allow me, then, to quote a passage from your well-known townsman, the late eminent Dr. Warburton Begbie. He says—'Consumption, as is very well known, was long considered to be incurable. It may, however, now be regarded as a *curable* disease, that is to say, persons affected with the general symptoms and presenting the physical signs (as determined by auscultation, percussion, &c.) of tubercular deposition on the lungs in all its stages, do again acquire a fair share of health and strength—in some rarer instances a *complete* restoration of both occurs; while the physical signs, being for the time stationary, afterwards undergo such modifications as are alone reconcilable with favourable changes occurring in the lungs.' This opinion may be objected to by some, but it is grounded on carefully-observed facts, recorded, moreover, by those who are the most skilled and eminent in the profession of medicine. A further and most corroborative testimony is found in the morbid anatomy of tubercular disease of the lungs. Appearances in these organs are frequently met with which are now almost universally accepted as the evidence of a retrograde process of a healing or curative action. This subject deserves an open and straight-forward discussion, which I do not think Professor Walley wishes it to have, as further on he attempts to point out that the word meningeal can only be applied to the brain lining, and not to the linings of the chest and bowels; and I do not know that these experiments that he talks of were ever tried after an animal's recovery. And it must be observed that this disease is not the same as pleuro-pneumonia, rinderpest, or foot-and-mouth, that are under the operation of the Cattle Contagious Diseases Act, as these are foreigners, and can be stamped out by slaughtering and disinfecting. But tuberculosis really cannot by these means. It is home-bred disease; and although every affected animal were slaughtered, &c.,—which seems an impossibility—before many months were past, in the present state of matters, there would likely be a pretty good beginning. I cannot help stating again that it is my conviction that this malady is not infectious in the ordinary sense of the term. I was intimately acquainted with the late Mr. Dewar, and once accompanied him in a three hours' *post mortem* of a tuberculosis cow, but at that time there was no word of infection or contagion. I have seen a whole herd have to be cleared out, but not at all from infection, but in-breeding heredity; and I have seen 15 or 16 affected, all blood relations, and, without using precautions of any kind, none of the rest became affected. The only cases of suspicion of contagion I can call to mind were those standing in continuous contact in the same stall, and it struck me forcibly that the nasty breath and sour smell of the sick animal played no mean part in the primary cause of the affection, by putting the stomach and constitution out of sorts. Moreover, allowing it to be contagious, and although cattle were rid of it to-morrow, where would the safety be so long as mice, rabbits, pigs, &c., are subject—specially subject—to contract it; and men and women who might unfortunately be victims going about squirting the sputum in the fields, the byres, on their food, &c., and while there is the number of latent cases that we know must exist from seeing so many scrofulous calves? And Dr. Begbie, in his practical and useful little volume, *Medical Information and Advice*, says that the medical profession of this country do not consider tuberculosis infectious. I think I gave my opinion distinct enough about the use of milk in my last letter, and beef also, produced from animals being, or having been, affected actually by tuberculosis; and does not the fact that there must be many cows suffering from latent consumption in dairies supplying human beings with milk, and also that it is quite within the reach of possibility that many more, from a change of food, localisation, climate, and other sanitary surroundings, may be the victims of spontaneous or natural arrestment of this dreadful malady, teach Professor Walley that it is our duty to examine the udders of all cows coming under our charge? And yet he has the assurance to say, teach us. What us? He and his staff of professors? I fear that would be a needless job, since the principal appears to have already made up his mind.—I am, &c.,

J. H.

—*North British Agriculturist.*

THE ENSILAGE COMMISSION.

The Private Ensilage Commission has presented the following preliminary report to the Agricultural Department of the Privy Council:—

The Commissioners have, up to the present time, held 11 sittings and examined 38 witnesses, comprising among their number owners and occupiers of landed estates and their agents, tenant farmers, designers and inventors of different forms of silos, or of different systems of applying the necessary weights to stacked or ensiled green fodder, chemists, and authors of pamphlets on the general subject. They have also had the advantage of hearing the views of Sir John Bennett Lawes, whose eminent knowledge of all matters relating to the chemistry of agriculture, combined with the fact that his published opinions on the process of ensilage have been regarded as unfavourable to the system, has rendered his evidence of great value and interest.

The Commissioners have by no means desired to exclude unfavourable evidence; on the contrary, they have endeavoured to induce some of those who were believed to be opposed to the system to give them the benefit of their opinions, but they have so far heard no expression of any decidedly unfavourable views. The evidence tendered has been entirely voluntary, all witnesses attending at their own expense. The evidence of all those who have practically tested the various methods of converting green fodder crops into preserved food for animals without putting them through any process of drying, such as is necessary in the making of hay, has, without exception, established their claims to a considerable amount of success; and, although in some cases, the results have been evidently more satisfactory than in others, the advantages which the different operators, one and all, have claimed for their systems seem to show that a nourishing and useful food for animals can be preserved, independently of any drying process, within wide lines of divergence in the details of the methods adopted.

It has been conclusively shown that, by different degrees of weighting and of expulsion and exclusion of atmospheric air from the material stacked or ensiled, different degrees of heat and of consequent chemical change are produced.

The degree to which such chemical changes increase or diminish the feeding value of the silage itself, or its relative value in comparison to the green crop, is, in the present state of knowledge, in great measure a matter of opinion, and careful feeding experiments conducted with a view to test the exact effect of these changes will be highly important to a solution of this question.

Silage which has been covered in immediately after cutting, and not again uncovered, has been shown to retain its colour and freshness, although developing small quantities of certain acids indicative of a process of fermentation without any considerable accession of heat. Other silage which has been put in at intervals and from which the air has not been immediately or entirely excluded, has undoubtedly developed considerable heat, and in this case the colouring matter of the leaves has been less well preserved. Yet in both cases a useful feeding material has been rendered available which, in unfavourable weather, would have been practically lost if any attempt had been made to convert it into hay.

Bearing in mind the importance of economy, the Commissioners have inquired into the efficiency of various systems of stacking unchaffed green fodder crops without drying, by which it has been contended that, with a proper system of pressure, the necessity for a silo can be done away with.

The Commissioners are not at present prepared to express any opinion upon the economy of any such system, or to compare its advantages with those which are claimed by the advocates of chaffed and close stored silage; but it seems to be established that a temperature sufficiently high to involve danger of fire can be controlled by a proper and efficient system of applying weight to the stack of green fodder.

The different systems of applying weight have greatly occupied the attention of the Commissioners, but as the quality of the silage does not appear to be materially affected by this question, it becomes simply one of economy, and may safely, for the present, be left to each operator to decide for himself, according to the special circumstances affecting the particular locality in which his farm is situated.

Some of the best samples of chaffed silage have been produced with pressure not exceeding 70lb per superficial foot, but the degree to which weighting is necessary or desirable, remains to be decided upon the greatest amount of evidence that may become available to us. Good results are claimed to have been obtained by means of weights varying from 7lb. to 300lb. per superficial foot on the top of the silage.

The experience of dairy farmers does not appear to justify the assertion which has been more or less circulated that dairy produce is, in any way, injuriously affected by silage as food; on the contrary, much valuable evidence has been received to show that the feeding of cows with well made silage distinctly improves the yield of milk and cream, and the quality of butter.

Where complaints have arisen of milk becoming tainted, the cause has been, in our opinion, traceable to its having been in proximity with strong smelling silage, or with persons who have handled it, rather than to the use of such material as food.

The Commissioners have already heard sufficient evidence to justify them in encouraging the development of the system of storing undried green fodder crops as a valuable auxiliary to farm practice. In addition to other advantages, the losses, occurring through weather unfavourable for haymaking, may be avoided, and some crops not hitherto grown in this country on account of the impossibility of ripening their seed (such as certain varieties of maize), may probably be successfully cultivated in certain districts, to the increase of our present means of feeding various kinds of live-stock on arable or partly arable farms.

Walsingham (Chairman).
H. A. Brassey.
A. M. Cardwell.
Drogheda
N. Eckersley.
Egerton of Tatton.
J. S. Gathorne-Hardy.
Wm. J. Harris.
Mitchell Henry.
James Howard.
H. Kains-Jackson.
Nigel Kingscote.
C. de L. Faunce de Laune.
J. C. Lawrance.
Peter McLagan.
Fred. Marshall.
Henry Robinson.
Stanhope Tollemache.
Jacob Wilson.

August 5.

It will be necessary to explain in a few words the nature of the Commission which has thus reported, and the circumstances under which it was appointed. The genesis of ensilage would have to be sought in remote ages and countries, but its modern practice, in Europe and America, has but a very recent history; a decade would include all issues of importance. In this country three years ago, the practice of ensilage was non-existent, but it was commenced on a small experimental scale. The known number of silos in 1882 did not exceed half-a-dozen. In October, however, of that year, a description of the practice as followed on a large scale in France, Holland, and America was given in these columns, and drew the general attention of agriculturists to the subject. Samples of ensilage and plans of a silo were forwarded to the then so-called Commercial Department, Board of Trade, by Mr. Kains-Jackson, and later the Prime Minister was questioned in the House of Commons on the subject, and he directed inquiry to be made thereon at the English Embassy in Paris.

Silos in 1883 began to multiply, and at the Royal Agricultural Show at Shrewsbury the first silo was publicly exhibited, being opened by the president, the late Sir Brandreth Gibbs. In 1884, the new Agricultural Department at the Privy Council Office, in the annual statistics collected, gave the number of silos as 610, and the process as a farm practice has so generally extended that a competition for prizes invited at the Smithfield Club, and where only some 30 entries were expected, quite ten times the number of samples were received from all parts of the kingdom, revealing an interest that was really national, and forming the first great display of ensilage in the world, although England had been about five years behind France and America in commencing the system. By this time also the Royal Agricultural Society had collected and published much information on the subject so generally favourable to the practice, that Mr. Henry Woods, who had first succeeded with the system on Lord Walsingham's estate in

Norfolk, seemed justified in styling the process a revolution in farming; while the words of this year's President of the British Association, Sir Lyon Playfair, spoken two years previously, "When ensilage experiments have been carefully conducted I have never seen a failure," were endorsed by the general excellence of the samples exhibited at Smith-field. The practice of ensilage had, therefore, become a fit subject for full inquiry to be made into its value at the instigation of Mr. Kains-Jackson, and an independent and private Commission was instituted, holding its first session at 44, Parliament street, at the office of the Privy Council, by the courtesy of the Agricultural Department. The minutes of evidence received by these private Ensilage Commissioners during March, April, and June have, together with the Preliminary Report printed above, now been published as a Blue-book in a return to addresses made in the House of Commons by Sir Joseph Pease and Mr. Mitchell Henry, and in the House of Lords by Lord Fortescue and Lord Wemyss.

As regards the constitution of this Commission, Lord Moreton asked, in the House of Commons, how it was appointed, when Mr. Trevelyan, in reply, said it was a private, self-elected Committee, which had applied for permission to meet in the rooms of the Agricultural Department, and that the Lord President had allowed them to do so This answer was a little inexact as regards "self-election" (seldom satisfactory), since Commissioners had been selected and solicited to act by the insitutor of the Commission, on account of their special knowledge of the ensilage process, their general acquaintance with husbandry, and as representative of Scotland and Ireland, as well as of England, as the list of names attests.

On behalf of the Commission, Mr. Kains Jackson issued from the Agricultural Department of the Privy Council a circular early in the year, inviting "the exhibitors at the late ensilage competition and other proprietors of silos in Great Britain and Ireland to give their assistance, by direct evidence or otherwise, to further an inquiry into an agricultural system alike important to landowners and tenant-farmers." The fact of the whole work being honorary and unpaid appears to have been rather an inducement than an obstacle to the inquiry. The testimony of the witnesses forms the Minutes of Evidence just published in a Blue-book of 212 pages, in which are nearly 5,000 questions and their respective answers. Lord Walsingham, the chairman, who attended every sitting and put the leading questions, is therefore by far the chief contributor to the volume, although all the Commissioners attended frequently and took an active part in examining the witnesses. The preliminary report now issued is signed by all the Commissioners, and while it is reserved in its language, it is decisive in its main conclusion. Much documentary evidence has been already received, and more doubtless will be forthcoming, as to the present season's practice, since we note in one of the questions, the chairman invites Sir John Lawes to attend at the end of the year, and probably the Commissioners' general report is deferred to accompany the completed documentary evidence.

The four cardinal virtues claimed for the process of ensilage appear to be (1) its safety in all seasons, its efficiency, and notably the avoidance of loss in the preservation of green crops; (2) the value of its products as food for animals, and its beneficial effects on the health of all stock to which it is given with discretion; (3) its utilization of substances almost valueless or otherwise waste; and (4) the elasticity the system affords for cropping the land, and in providing a succulent food available all the year round, by which an increased number of stock per acre can be maintained.

Certainly, the evidence may be said fairly to establish these points, and the Ensilage Alphabet of Inquiry circulated by the Commissioners takes them up in detail. It may be here mentioned that the reported evidence is from the notes of a short-hand reporter experienced in "commission" work, while as representatives of the Press were admitted to every sitting, the general tenour of the evidence is substantially already known. Under the letters of the alphabet with numerals for sub-subjects the inquiry thus classifies the information sought.

A.—(1). That the preservation of green crops by the ensilage process is a valuable auxiliary to farm practice, (2) affording safety to the whole crop produced, and (3) given elasticity and economy to crop rotation is answered by most witnesses affirmatively, several of them asserting that they could keep 20 to 50 per cent more stock than under former systems.

B and C referred to the construction of silos and various details of working them. Most of the silos appear to be constructed above or partly below the ground level, a few, and some of the best, being altogether below ground. Witnesses were unanimous in advocating efficient treading of the forage, whether chaffed or unchaffed, whatever the system of pressure or weight per superficial foot. In an analysis of the prices given at the last Smithfield Cattle Show at which there were no fewer than 340 competing samples, it was noted that silage compressed by means of dead weight took 27 prizes and commendation out of 35; whilst the remaining 8 prizes were awarded to silage compressed by mechanical pressure silage pressed by the system of chain pressure introduced and patented by Messrs. Reynolds & Co. engineers, Blackfriar-road, London, taking no less than five, although only 34 using this pressure were in competition it would thus be seen that out of every 6 4/5th competitors using Messrs. Reynolds' mechanical pressure one received a prize. Whilst mid the dead weights and other mechanical pressure only one in 10/15 was successful.

In most cases dead weights were of bricks, planks, pig iron, concrete blocks, and in bags or barrels, billets of wood, or simply dry earth. Mr. Swan, the first witness called, and winner of the champion cup at the Show, weighted his ensilage with bricks. Mr. Hardy, of Weedon, used Reynolds and Co.'s chain system, and believed it cheaper than any appliance of dead weights. Mr. Woods, at Merton, in using rough farm-made boxes of wood filled with stones, applied 70lbs. to the foot, believed the cheapest and most effective pressure was obtained. A great number of devices has been adopted to give the supposed necessary pressure. A foot of plain sand direct on the forage at Shrewsbury was found satisfactory, as in many other notable instances. The cost of a silo naturally is very different—7s. 6d. to 30s. per ton of space—and cannot here be specified in detail.

D.—Most silos appear to have been built by occupying owners, and a large proportion by the conversion of old buildings. But jointly, at owners' and tenants' expense, the silo accommodation of the country is increasing, while some tenants are making their own silos with materials, such as the concrete slabs of Messrs. Lascelles, which can be removed and remain of good value for other purposes. The materials used include bricks, concrete, wood, iron, slate, &c.

E.—The names of crops, put into silos, cover most of the produce of the land, grass representing quite one-third of the total; next come clover and rye. Clover, maize, rye, beans, oats and peas sanfoin, tares, trifolium, buckwheat and hop-bines, spurrey, cabbage, and mixed crops have all been successfully preserved. The right stage of ripeness of the crops is fairly established in most cases, farmers and chemists being here in agreement.

F and G.—Refer to costs of chaffing crops and where such process is desirable. Here the balance of evidence favours chaffing, but in the case of meadow hay much excellent ensilage has been made from unchaffed grass. The records of temperature are very imperfectly given, and on this important point further information is desired. The ensilage made at Merton, where the temperature does not usually exceed 80 deg., was of the finest character, but yet sweet ensilage, like that made by Mr. Howard and many others, remains excellent food after exposure to a temperature of 120 to 150 degrees.

H.—Replies to this question show the super-silo is not often used; that shrinkage after pressure is very various, from a fourth to a half of the bulk, and that after the first fortnight very little shrinkage occurs.

I and J.—Offered the moot point of extra costs in carting green forage as against dry hay, and *per contra* the costs saved through not having to make hay. The answers are not decisive, but the balance of testimony is that making ensilage is less costly than making hay, even in ordinary weather.

K.—Is a question as to dates of filling and opening, &c. The evidence indicates that at any time after two months from the filling, the siloed crops are available for feeding, and will remain good for over a year.

L.—Rations for fattening stock, for cows in milk, for store cattle, for sheep, for horses, are used in very different quantities. Apparently, as reasonable, ensilage is of most value as a mixed food.

M.—Elicited reports of experiments on fattening cattle, showing ensilage about equal to the best other food, and for cows in milk and ewes in lambs as superior to most other winter provender.

N.—The evidence was in favour of ensilage for its effects on the yield of milk in quality, taste, and quantity. The testimony of Mr. Sparks in reference to the condensed milk factories refusing milk from ensilage-fed cows was to the effect that, in view of exporting large quantities that had to be kept for long periods, the management simply acted with precaution in waiting to learn from experience the effects of feeding on ensilage; while their demand for milk from cows fed on old systems was amply supplied. Mr. Barham witnessed to the good character of the thousands of gallons daily received of milk made from ensilage cows. It seemed to be preferred by the customers of the Dairy Supply Company.

O.—The health of the stock fed on ensilage appears to be affected in a few cases unfavourably, but much more often advantageously, and probably increased experience will enable farmers and dairymen to make ensilage valuable as an health agent as well as a food for their stock.

P.—Scarcely any witness offered an opinion as to the value of manure from feeding a ton of ensilage as compared with the value of manure from a ton of roots. According to ordinary formula, the product should be quite double in favour of ensilage, manure from feeding hay being much better than that from feeding roots.

Q.—Produced but one direct answer as to the value for the silo of an acre of green wheat. The estimate was £6, plus the saving of hoeing and weeding the crop.

R.—Referring to analyses and feeding experiments elicited returns mostly in writing, as documentary evidence.

S.—Was a crucial point, asking whether the produce of an acre of forage made into ensilage was of more or less value than the same produce made into hay. The replies generally will be found in favour of ensilage, nor is the evidence of Sir John Lawes on this point opposed to the other witnesses.

T.—May be reckoned as establishing the present position of the ensilage process as satisfactory. Most of the experimentalists were satisfied with the present silos and appliances, and in view of building fresh ones, only suggested trivial alterations.

U.—Referring to the stacking process, received but very attenuated evidence, but its desirability was evident, and the present season will afford ample evidence as to the economy of making ensilage without a silo, a £25 prize being offered by the Royal Agricultural Society of England.

V.—Introduced the discussion as to the desirability of making sweet or sour ensilage, the verdict of which has yet to be given by the chemists. The dividing line between the two is not drawn, and undeniable witnesses assert both sorts of ensilage are good; cattle and other stock thrive on either.

W.—Asked if ample silo accommodation existed, what would be the system of cropping to be recommended, but any definite opinion was not received.

The remaining points, as to preservation and storage of grain in silos, as to the methods of making ensilage forage marketable and available for town dairies, were adverted to by some witnesses without affording the Commissioners grounds for any definite conclusions, judging from their preliminary report.

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Health, Crop and Weather Report.

[For the Week ending 11th November 1885.]

Madras.—General prospects fair; continue favourable in Bellary and Anantapore.

Bombay.—River still falling in Sind; slight rain in parts of fourteen districts; more rain required for *rabi* crops in one taluka of Nasik and in parts of Khandesh. Reaping of *kharif* and sowing of *rabi* crops nearly completed in some districts; in progress in others. Cholera in parts of eight; fever in parts of fifteen; cattle-disease in parts of eleven, and small-pox in parts of four districts.

Bengal.—Some rain fell in Orissa and in Singbhoom and Manbhoom; cold weather is sitting in. Prospects of rice crops are generally very favorable, except in the flooded tracts previously reported, and in South Behar where want of later rain has done harm; *rabi* crops are being largely sown, but in Behar *rabi* and poppy sowings are backward for want of rain. Price of rice has fallen in almost all districts. Public health generally fair.

N.-W. P. & Oudh.—Weather getting cooler. *Rabi* sowings in progress everywhere and prospects said to be good. Markets are well supplied and prices on the whole steady. General health fair.

Punjab.—Fever in the Delhi and Peshawur districts, in the Kahuta tahsil of the Rawul Pindee district, and in the Dehra Ismail Khan city, also a few cases of cholera in the Dehra Ismail Khan district; health otherwise good. *Kharif* harvesting nearly completed; *rabi* operations in progress. Rain is much needed. Prices rising in the Ferozepore, Umritsur, Sialkot, Lahore, and Shahpore districts; stationary elsewhere.

Central Provinces.—Weather cloudy and close. Prospects continue favourable. Fever prevalent in a few districts. Prices steady.

British Burmah.—Cholera slight in five districts; elsewhere public health good; cattle-disease slight in six districts; elsewhere health of cattle good. Crop prospects good except in Thayetmyo, Bassein, and Prome, where rainfall has not been sufficient.

Assam.—Weather seasonable; mornings foggy. *Kalazar* seems to be still lingering here and there in Luki Tehsil. Mustard being sown. The *sali* paddy has been injured here and there by insects; state of other crops and prospects good. In some parts of Cachar partly destroyed by insects; tea-plucking will soon cease. Common rice 13 seers 15 chittacks per rupee. Public health good.

Mysore and Coorg.—Standing crops in good condition; recently sown *ragi* in the Bangalore districts is reported to be in need of a few more showers of rain; prospects of season and public health generally good, cattle-disease still prevails in parts of the Malnad district. Prices have slightly risen except in the Tumkoor district, where they were reported to be falling. Prospects of season and public health good.

Berar and Hyderabad.—Weather close in Omraoti, where cotton-picking continues, *rabi* sowing nearly completed, wheat 22 and jawari 26 seers per rupee. *Kharif* crops in good condition in Akola, where *rabi* sowing progressing. The rainfall in Hyderabad has damaged *rabi* and *kharif* crops to some extent and breached many tanks. General health fair, except in Shahabad taluka, where fever prevails. Prices—Wheat 13, coarse rice 12¼, yellow *juar* 23¼, white *juar* 19¼, and tur 15¼ seers per current sicca rupee.

Central India States.—Cholera in town of Rewah, 24 cases, 15 deaths. Weather cooler. Sowing of opium, gram and wheat in progress. Health and prospects good. Ploughing and *rabi* sowings commenced in Nowgong, where prices falling. Sowing operations almost finished in Manpore.

Rajpootana.—*Rabi* sowings commenced and in progress. Weather dry, cool at nights. *Kharif* crops have been cut in Meywar, where prices rising and fever prevalent. *Jowar* ripening; tanks and wells drying in most places. Rain needed everywhere. Health fair. *Kharif* crops injured in Kerowli where fever prevalent, and prices rising. Prices stationary in most places.

[For the Week ending 18th November 1885.]

Madras.—General prospects fair continue favourable in Bellary and Anantapore.

Bombay.—River low in Sind. Rain in parts of nine districts, more required in parts of Poona, Nasik, Ahmednuggur, and Khandesh. Reaping of *kharif* and sowing of *rabi* crops continue in most districts. Standing crops damaged by insects in parts of Panch Mehals and by blight in parts of Satara. Cholera and small-pox in parts of six, fever in parts of twelve, and cattle-disease in parts of nine districts.

Bengal.—Rains have ceased, and cold weather has set in. Outside the flooded tracts, and except in parts of Behar where some harm has been done by the failure of rain in October, the rice crops generally promise an excellent harvest; cultivation of *rabi* crops and *boro* paddy is proceeding well, but in Behar want of rain somewhat interferes with *rabi* and poppy sowings; harvesting of earlier sorts of *aman* rice has commenced; the price of rice has consequently fallen in several districts. Public health continues generally fair.

N.-W. Provinces and Oudh.—Weather seasonable; *rabi* operations still in progress; in some places completed. Prospects are said to be good and prices generally steady. Public health is fair; cholera and fever continue in a few districts.

Punjab.—No rain; it is much needed. Fever in the Delhi and Peshawur districts, in the Kahuta and Attock tahsils of the Rawul Pindee district, and in the Dehra Ismail Khan city; cholera in the villages of Kulachi, Gumal, and Mularjal in the Dehra Ismail Khan district; elsewhere health is generally good. *Kharif* nearly harvested; *rabi* operations in progress. Prices rising in the Umritsur, Sialkot, and Shahpore districts, falling in the Rawul Pindee district, and generally stationary elsewhere.

Central Provinces.—Cold setting in. Prospects continue favourable. Fever and cholera in places. Prices steady.

British Burmah.—Cholera slight in three districts; elsewhere public health good; cattle-disease slight in five districts; elsewhere health of cattle good. Crop prospects good in all districts except in parts of the Prome and Thayetmayo districts, where the rainfall has not been sufficient.

Assam.—Weather seasonable. Public health fair. State and prospects of crops generally good. Tea-plucking will soon cease. Common rice 14 seers 8 3/5 chittacks per rupee. In Debrugurh the prospects of tea, sugarcane, *matikalai*, and other crops good.

Mysore and Coorg.—Rain fell more or less abundantly in the Malnad district, and slightly in parts of the Maidan Taluks of the State. In the Tumkur district and in parts of the Bangalore district late sown crops are reported to be in want of more rain, otherwise standing crops in good condition. Prospects of season favourable. Public health generally good; small-pox at some places. In Tumkur and Shimoga districts drinking water and pasturage available. Cattle in good condition, except in parts of the Shimoga district where murrain still prevails. Prices in the Tumkur district reported stationary, elsewhere have fallen. Coffee crops being picked. Prices of food-grains slightly risen in Mercara.

Berar and Hyderabad.—Weather clear and cool. Prospects favourable. Second picking of cotton in progress. Wheat 22 and *jowari* 26 seers per rupee in Amraoti. *Kharif* harvesting commenced; *rabi* crops progressing favourably. Break in weather proved beneficial to standing crops; *rabi* sowings continue. Fever prevails in some places. Prices—wheat 13, coarse rice 12½, white *juar* 19½, yellow *juar* 26¼, and *tur* 16½ seers, per current sicca rupee.

Central India States.—Weather cooler and seasonable. Health and prospects good. Cholera decreasing in Rewah; 9 cases of cholera, 6 deaths. Weather seasonable. Crops doing well. Health good. Total rainfall 40·17; heavy hailstorm on 12th. Prices falling; sowing operations finished; opium sowing commenced.

Rajpootana.—Fever still continues; otherwise general health good. Crops being gathered in Mewar. Prices tending to rise. Tanks and wells fair in Sirohi, Kerwara, Marwar, and Bhurtpore, *rabi* sowings about to commence in some places and in progress elsewhere. Tanks and wells decreasing in parts. *Kharif* crops being harvested and *rabi* sowings actively carried on in Bhurtpore. Prices rising in some parts and stationary in others. Prospects fair.

Letters to the Editor.

FISH MANURE FOR TEA GARDENS.

TO THE EDITOR.

SIR,—A correspondent of yours, writing "from his own experience," recommends the application of fish manure to tea-plants. Will he kindly say—

1. How much does it cost to fish-manure 50 acres of tea?
2. What quantity is to be applied per bush or per acre?
3. Where is this fish manure to be obtained from?
4. Where is the garden in which your correspondent applied fish-manure to tea-plants?

AN INQUIRER.

Editorial Notes.

IN another column will be found an analysis of the American corn crop for 1885, which shows that, notwithstanding the bad season, it is estimated to exceed the last year's crop by 187,200,000 bushels.

⁂

LATEST advices state that the Melbourne tea market is active at ten per cent reduction on China teas. Good sales of Indians and Ceylons are reported, and the landings are heavy. Stocks are increasing, the recent quality having met with approval.

⁂

IN another column will be found two interesting papers on Coca, taken from the *Chemist and Druggist*. The one furnishe particulars as to cultivation, drying, and statistics as to produce at the source of supply, and the other the results of experiments with the hydrochlorate of cocaine as an anæsthetic.

⁂

THE *Pioneer* has noticed at some length the annual statement of the wheat crop published by Sir J. B. Lawes The report is of value, inasmuch as agricultural observations have been continuously made on Sir J. B. Lawes's experimental farm at Rothamstead for 42 years. The review will be found elsewhere.

⁂

WE understand that the agricultural loans advanced in the Moorshedabad District on account of the recent floods amounted to Rs 16,532. The Relief Committee distributed Rs. 3,500, and have still Rs. 1,289 in hand. The works on the roads employ 1,200 persons, and the Collector reports that "al classes seem to be contented."

⁂

THE total quantity of tea exported from China and Japan from the commencement of the season to the 27th of October, amounted to 118,113,895 lbs., as compared with 120,278,493 lbs. during the corresponding period of last year. The exports to the United States and Canada during the same period were 55,387,482 lbs, as against 53,355,069 lbs.

⁂

AT the request of the Revenue and Agricultural Department of the Government of India, Mr. H. Caine, of the Poosa Farm, has drawn up a memorandum which will be found elsewhere, regarding the method employed at the Farm for cultivating, preparing soil, sowing, planting and treatment of tobacco while growing, for the information of the Superintendent of the Andamans and Nicobar Islands.

⁂

THE Government of Madras have approved of a proposal to hold an Agri-horticultural Show at Rajamundry this year, similar to the one held last year, towards which a contribution of Rs. 500 will be made by Government. The show in 1884 was pronounced a success, and we hope the management will be equally successful this year. It is calculated to cost Rs. 2,440.

WE notice the appointment of Mir Mahomed Hussain to be Assistant Director of Agriculture and Commerce in the North-West Provinces. The post has always hitherto been filled by a covenanted civilian or military officer. Mir Mahomed Hussain owes his elevation not only to his success at the Cirencester Agricultural College, but to his practical aptitude since displayed in the Agricultural Department of the North-West.

⁂

FROM the statement showing the annual forecast of the Cotton crop in the Hyderabad Assigned districts for the season 1885-86, it appears that the area under cotton falls short of the previous year by 6·6 per cent. The reason for this is said to be the want of timely rainfall; but a 12-annas outturn is nevertheless estimated, which is warranted by the healthy appearance of the plants. On this basis, the crop of the year is estimated at about 20 per cent over that of last year, the probable yield being put at 490,000 cwts.

⁂

THE report on the rice prospects of British Burmah for October 1885 is as follows:—

> "The area under rice is now reported as 191,936 acres above last year's area, giving an increase of 6·2 per cent. The rainfall has been favourable in October in the lower districts of the delta, but in Henzada, Promo and Tharrawaddy the rainfall was not sufficient, and a light crop may be expected in these districts, unless they get more rain at an early date. In the other districts the crop prospects are reported to be very good."

⁂

THE Chicago *Tribune* publishes the following figures as representing the annual cost to the people of the United States in intoxicants and tobacco:—Alcoholic liquors, 540,000,000 dls.; malt liquors, 306,000,000 dls.; tobacco in its various forms, 292 000,000 dls.; total, 1,138,000,000 dollars. This is equivalent to 20 dls. per head of the entire population, and to two-thirds of the present national debt. The *Tribune* does not think it can be claimed that this is all wasted, as a large proportion of it is paid in wages to producers and manufacturers, or as revenue to the national and local governments.

⁂

THE services of Mr. Havell are to be placed at the disposal of the Madras Revenue Department for deputation upon special duty, for the purpose of making a tour of inspection in the northern districts of the presidency, and collecting information as to arts and manufactures existing in those districts. The Director has suggested certain arts and industries for investigation, and has drawn up a list of such as may with advantage be examined by Mr. Havell. We should have an interesting report by Mr. Havell shortly.

⁂

The Resolution of the Government of Bombay shows that Irrigation is advancing with rapid strides in that presidency. The area for which irrigation from the Government canals and tanks was applied for from the beginning of the *kharif* season to the 15th October this year was 29,855 acres, as compared with 21,833 acres for the corresponding period of 1884 and 17,386 for 1883. Of the increase of 8,022 acres, as compared with last year, 2,952 acres are credited to the Nira Canal, which was opened on the 15th June 1885, and the rest, viz., 5,070 acres, are made up of general increase on almost all the other works Except in Guzerat, the increase was not due to deficient rainfall, and is regarded by the Government as satisfactory.

⁂

"PINK BUTTER" is to be the name of all compounds made in imitation of butter in New Hampshire. The *N. E. Farmer*, an American paper, says on this subject:—

> "Hereafter all oleomargarine, or articles or compounds made in imitation of butter, and sold or offered for sale in the State of New Hampshire, must be colored *pink*; no other color or shade whatever will pass muster, and if any unfortunate manufacturer should happen to get his goods colored a little too highly, say to a 'crushed strawberry' tint, in his honest desire to make them pink enough to answer the stern requirements of the law, we presume he would be in danger of having to pay the fifty-dollar fine. Why not have a legal standard of pinkness, to be kept by the local sealers of weights and

measures, and also a further provision for the scientific testing of jurymen for color blindness?"

The *Farmers' Review*, another American paper, comments as follows on this question :—

> Decidedly a good idea, provided the courts do not pronounce it unconstitutional. If all imitations of butter could be required to be made of distinctive color, unlike the genuine article, the dairy man would then well afford to submit to the competition with them. Since such compounds are all artificially colored, why not provide by law that they shall be of a color unlike that of genuine butter? This would do away with all fraud in their sale to consumers. We shall watch with interest the practical operation of the law in New Hampshire.

If a distinctive feature of this kind is wanted anywhere, it is in India—especially in Calcutta, where the most nauseous compounds are passed off as butter.

⁂

ONE of our American exchanges tells us that the phosphatic rock deposits of South Carolina are now the principal source of supply of the phosphate of lime used in the manufacture of commercial fertilizers throughout the world. The district underlaid by them, of which Charleston is about the centre, is some seventy miles in length by thirty in breadth, and the supply is considered to be practically inexhaustible. It crops out at the surface in some places, and in others is overlaid with soil to a considerable depth. The State levies a tax of one dollar per ton on all that is shipped, making quite a source of revenue, since the production last year was about 500,000 tons, and is yearly increasing to meet the increased demand for it.

⁂

THE following is the second report on the prospects of cotton in the Bombay Presidency for 1885 :—"*Sind* returns not received. *Gujarat*, British districts :—revised area 600,000 acres or 50,000 acres above average; Native States, returns incomplete; prospects improved. *Deccan* (excluding Khandesh) :—Satara above average 16,000 acres, Nagar, Sholapore, Nasik, and Poona much below average, last two far below last year; total area 42,000 acres against average 125,000 acres. *Khandesh* :—662,000 acres or 200,000 below last year and 125,00 acres below average; late rains have improved the crop. *Southern Mahratta Country* :—sowings late: Dharwar 375,000 acres, Belgaum 125,000 acres, both up to average; Bijapore 150,000 acres average 275,000 acres, rains deficient. Estimate for Kolhapore and neighbouring State 150,000 acres; *young crops* healthy."

⁂

THE Madras Government have recently sanctioned a proposal made by the Director of Agriculture to spend a small sum during the current year on a ploughing competition to be held in the Kurnool district during this month. Among the reasons assigned for selecting Kurnool for this purpose, it is stated to be one in which the "sign of progress," pointed to by Government in April 1884, may very probably be exhibited, *i.e.*, says the Director, "it is quite likely that ryots may, using improved ploughs drawn by their own cattle and held by their own men, compete against their neighbours using the country plough." The Government, in conveying sanction have observed that, although an allotment of Rs. 200 is available for "the exhibition of improved ploughs and machines," no allotment has been provided for ploughing competitions. The small sum required will, therefore, be provided from savings.

⁂

THE report of the indigo brokers is that nearly half the crop of native Oudhs has already arrived in the market, but that proprietors are holding out for very high rates. Packing is going on busily in Bengal and Tirhoot, but it is expected to be at least another fortnight before a good supply from these quarters comes to market. Most of the boiling samples from Bengal and first cuttings from Tirhoot have arrived. The former are said to be fully up to the average, and some even very superior; whilst the latter are of average quality, but contain no very fine samples. The *khoontees* are said to be decidedly inferior, owing to the unfavourable manufacturing weather. On private sale the Baromasea, Moorshedabad, factory, have obtained at Rs. 300 per maund, for 320 maunds, with the usual rejections.

THE following experiments by Mr. M. A. Lawson with coca leaves will be read with interest :—

> The uses to which cocain has been put in surgery by the Faculty has rendered it desirable to test the amount and nature of alkaloid from plants grown in India. Some leaves which had been carefully dried in the shade from trees in Barliyar have, on three occasions, been analysed by me. The first sample was examined by Trupheme's method; it yielded ·2 per cent of an alkaloid which gave no characteristic result of physiological action. The second sample was treated according to Castaing's method, and gave about the same amount of alkaloid, which produced distinct numbness on the tongue, but Dr. Drake Brockman of the Eye Infirmary, Madras, reported that it produced a smarting when applied to the mucous surface. A third sample had been tested by Dr. Squibb's process which afforded ·50 per cent crude alkaloid and ·30 per cent cocaine hydrochlorate. This had a very marked numbness on the tongue, and has been sent to Dr. Brockman who has kindly promised to report upon its value.

⁂

OUR Ootacamund contemporary, who is an authority on all descriptions of planting, observes that it is always extremely difficult to estimate the probable quantity of cinchona bark that may be exported from this country in any one year. The price at home, if high, stimulates production; if low, it has a contrary effect. A planter finds that delay in harvesting cinchona bark has not the same effect as with tea or coffee. With tea a flush must be picked when it appears or it is lost, so with coffee the fruit must be gathered when ripe or loss will ensue, but in the case of cinchona, delay has the effect of improving the crop, and the quotations of the market at the moment are all powerful factors in the outturn. If these quotations are good, a considerable output is the result: if bad or indifferent and the planter can afford to wait. exports fall. There is just now a slight rise in the market for cinchona bark at home, and we may look for some activity in harvesting, but 6½*d* a unit will never prove remunerative for the bulk of growers, who have only branch and twig bark to dispose of, and trunk bark from trees yielding a low percentage of sulphate of quinine.

⁂

A CONTEMPORARY notices with regret that the Government should remain so persistently passive and indifferent to the important subject of developing the mineral resources of various tracts of the country in Southern India (more especially the Wynaad), leaving it to the enterprise of private capitalists either to make or mar the mining industry which, if successfully established, would gladden the hearts of shareholders and compensate them for the investment of their capital and the patience they have exhibited; while on the other hand, the country itself would be enriched, and the now much depreciated rupee would revert to its original value. Our contemporary goes on to say that in Hyderabad, the Nizam's Government is making strenuous efforts to develop the mineral resources of that part of India, and has entered into arrangement with a firm in England with this object in view. In Mysore the gold-producing character of the country cannot be doubted, and the last returns yielded fully realise the best expectations. The Devala Moyar Mines, which are cited as examples, are said to be almost paying expenses, and it is confidently *asserted that a much more satisfactory result will soon be obtained; but yet, in the face of all this, the Government* stands aloof, and will make no effort to assist private enterprise.

⁂

THE digestibility or otherwise of cheese is a question upon which very diverse opinions exist. By some it is maintained that cheese should be eaten before meals, by others that it should not be partaken of unless after meals, with a view to assist digestion. There are those again who hold that it should be eaten with the regular meal. In this country we believe, it generally forms the *last* course of a meal, from which it may be inferred that it is regarded more as a condiment than anything else, and is believed to assist digestion. We have always thought that cheese was more or less harder of digestion than ordinary food. This would appear to be an erroneous conclusion, according to the experiments carried out by an eminent German chemist, Von Klenge, who undertook to determine the digestibility of different samples of cheese with the results given below. He was of course obliged to conduct his analyses with artificial gastric juice, and the figures obtained show the percentage of the total proteine or caseine which was digested or dissolved, and which may be taken as representing the relative proportions of their substance taken into the system for assimilation and nutrition. The list of tests was—

Emmenthal, first quality	97·5
Emmenthal, second quality	92·3
Romadour	94·
Gorgonzola, second quality	94·4
Mainz, hand cheese	93·
Cheddar, second quality	91·6
Roquefort, fresh	90·9
Brie, second quality	87·3
Neuchatel	85·6
Swiss skim-cheese, fresh	77·1
Swiss skim-cheese, old	90·2
Meat, cooked with butter	97·5
Eggs	97 4
Milk	91·7
Milk, with cheese	96·2

⁂

AN American journal commenting on these results, says :—

It will be noticed that of two qualities of Emmenthal cheese, the better one is the most digestible, because it contained 2·5 per cent more fat. The Brie and Neuchatel stand much lower in digestibility than even a second quality Cheddar, and the Cheddar is lower than the odoriferous Limburg. The favourable effect in ripening, in increasing digestibility, is seen in comparing the fresh and old Swiss skim cheese, where ripening greatly increases the value of the skim cheese. Comparing cheese and other kinds of foods rich in proteine, it is seen that the opinion that cheese is a particularly indigestible form of such food is not well founded, provided it is good in quality and well ripened. This experiment shows that the proteine or caseine is as completely dissolved as is the proteine or fibrine of meat or the proteine or albumen of eggs, and much more so than when the same caseine is taken in fresh milk. In order then to do away with the widespread prejudice against the digestibility of cheese that prevails in America, or at least in the United States, the cheese-maker for home consumption should not only make a cheese rich in fats, but he should have it well ripened before sending it out for consumption.

⁂

MR. L. B. ARNOLD, in a letter to the *National Live Stock Journal* on this subject, says that in 1878 and 1879, he, associated with Dr. F. E. Englehardt, of Syracuse, N.Y., made large numbers of experiments on the digestibility of every kind of cheese they could obtain. The results, it is said, did not differ materially from those since obtained by Von Klenge and which we have quoted above. He found that "cheese well cured and containing all the butter fat of the milk" was more digestible than green, or partly cured, or skim cheese, and that the skims were not so valuable for food in proportion to price as full cream cheese. In fact that, cheap skim cheese was dearer as an article of food than rich full cream cheese at its full price. Meat, eggs, and milk bear almost the same proportion of digestibility as cheese, and that of the three first-named milk was found to be the least digestible. The old opinion then, which has been maintained for so long by some of the most distinguished chemists of the age, that milk and eggs formed the "most perfect food," must be somewhat modified ; for according to Von Klenge, meat cooked with butter gave the same results as first quality Emmenthal cheese, and the percentage of digestibility exceeded that of pure milk by 6. This is somewhat in variance with the hitherto accepted conclusions.

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AMONG the large quantity of indigenous gums and other vegetable substances sent to him for examination, Mr. M. A. Lawson notices the following :—

Moringa Gum.—The gummy exudation of the horse-radish tree (*Moringa pterygosperma*) consists chemically of a large quantity of bassorin or insoluble gum with a small proportion of arabin or the soluble kind and a trace of moringa-tannic acid. It swells up to a remarkable extent when steeped in water, gelatinizes with ferric chloride, gives an abundant precipitate with subacetate of lead, and is soluble in caustic alkalies. In these and other respects it resembles the Gum-Hogg of America. Gum-Hogg is derived from an unknown source and imported from the East Indies ; it is used in marbling paper for binding books. It seems not improbable that Moringa gum, if not identical with it, could be used for the same purpose in the arts.

The funicles of the Black Wattle (*Acacia melanoxylon*) are in the shape of pink contorted bands, and were supposed to contain a dye. They were free from starch and tannin and yielded 6 per cent of moisture and 2 per cent of ash. Their chief constituent is an albuminous matter similar to the white of an egg. About 30 per cent is readily extracted by macerating the funicles in water. When this solution is heated, the albumen coagulates and the pink coloring matter is destroyed. Being of no use as a dye, their peculiar office seems to be that of affording nourishment to the seed.

Deposit from the milky secretion of the Jack fruit (*Artocarpus integrifolius*).—This was a thick white tenacious substance similar to bird-lime, with no marked odour and taste. It contained 20 per cent water and the residue burnt with a bright flame giving off a sooty smoke. It was insoluble in water, partly so in alcohol, and entirely in benzol. It was a variety of caoutchouc, and as such would be useful as a bird-lime, and a cement for broken articles.

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AN Australian paper, the *Queenslander*, publishes some interesting particulars regarding the manufacture of orange-wine. It says :—

Some time ago in the Querists' column of the *Queenslander*, the subject of making wine from oranges was mooted. In response to our request for practical information, a vine-grower and wine-maker, who has within the last few years visited many of the European continental vineyards, called upon us. He informs us, and wishes the fact to be made widely known, that a most excellent wine can be made from the juice of the orange and that since the troubles caused by the phylloxera, a large proportion of the "sherry" of commerce is orange-wine. Moreover, when properly prepared, he says, this orange sherry is a most pleasant and healthful wine ; indeed in his opinion it is only a matter of a few years, and the greater part of the wine in the world will be made from oranges, for the product is equal to that made from the juice of the grape, and the yield per acre considerably more. His argument is that in consequence of this discovery, the planting of orange groves in suitable localities in Queensland cannot be overdone. As endorsing these conclusions, in the Melbourne *Leader* we find the following paragraph :—"It is stated the manufacture of orange wine is developing into a very extensive business in Florida, where a magnificent American wine is being made in large quantities from the juice of the sweet oranges, surpassing in purity any of the European wines. 'It is said to be the best tonic, medicinal or otherwise, that can be taken in the human system. It is nourishing, of agreeable flavour, and, what is more, a perfectly pure native wine.' No part of the fruit is used in the manufacture of the wine but the pulp of the perfectly ripe oranges, and none of the wine bottled from the casks until it is at least three years old. In taste, it is marvellously palatable and contains but 8·64 per cent of absolute alcohol and slightly over 5 per cent of sugar. Florida, filled with orange presses, says the Philadelphia *Times*, will outrival the famous vineyards of France and Italy in time, for the manufacturers of this splendid wine are pushing ahead with new and improved machinery, are setting out countless orchards of the precious fruit, and investing thousands of dollars in the enterprise, which they are satisfied will soon become one of the greatest industries of the countries. The supply now is no ways equal to the demand."

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IT is not perhaps generally known that Assam contributes largely to the cotton trade of India. In the absence of accurate statistics it is difficult to arrive at a correct calculation of the total area under cotton, but it has been estimated to cover 38,815 acres, exclusive of the Naga hills. Of this about 7,000 acres are situated in the plains districts, and the remainder in the Garo, Khasi, Jaintia, and north Cachar hills, the largest proportion being in the Garo hills, where it it estimated at about 22,933 acres. Occasional patches of cotton occur in the plains, where the Miris grow a limited crop for their own use in the district of Lukhimpore and Sibsaugor. On the lower slopes of the Bhootan hills cotton was once said to have been extensively grown, and Kamroop was famous for it. But the trade has now decreased considerably, though in certain areas of the Khasia hills, in the Kamroop district, *jhuming* is still carried on to a limited extent. In the Goalpara district about 1,600 acres are under cotton, but this is confined to the Sidli and Bijni pergunnas. The chief cotton-growing district in the Assam Valley would appear to be Nowgong, in which the Mikir hills are included. The area under cotton here is estimated at 3,286 acres. The Sarma Valley has about 1,400 acres under cotton, confined principally to the Sylhet and Cachar sub-divisions. The latter, however, does not include the North Cachar hills, where cotton occupies about 4,000 acres, and is largely exported as well as used for local consumption by the hill Cacharies, Nagas, and Kukis. In the range of mountains which extends from the head of the Brahmaputra Valley to the confines of Mymensingh, cotton forms nearly everywhere the staple crop, and large quantities are annually exported to Kamroop, Nowgong and Sibsaugor.

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It is stated by a contemporary that, at the request of the principal mercantile firms in the Central Provinces, the Chief Commissioner has decided to make an attempt to substitute weighment for measurement in the grain markets of those Provinces. As is not unusual in this country, there is a great diversity in sizes of the different measures at present in use in different markets. Of course it might be possible to substitute one single general measure of capacity for use locally; but this would only partly meet the difficulty, as the grain is sold by weight in Bombay, and its carriage charged for by weight by the Railway Companies. Another difficulty, which will not be met by the introduction of standard measure, is that the grains, especially wheat, vary very much in weight according to their different kinds and at different seasons of the year. The new weight to be adopted as the standard will be the seer of 80 tolahs, which is the weight on which the Great Indian Peninsula tariff is based, and which is already experimentally in force in the markets of Jubbulpore and Kampti. Mr. Crosthwaite now purposes to introduce the new system of weighing in the markets of Kareli, Gadarwara, Hoshungabad, and Hurda, to be managed, if possible, by licensed weighmen under the orders of the Municipal Committee, whose co-operation is to be invited. A supply of the proposed new weights is shortly expected, when they will be issued from the office of the Director of Agriculture to Municipal Committees, in sets of five, consisting of one weight of five seers, one of two seers one of one, one of half a seer, and one of a quarter seer. Sets of weights will also be given free of charge to every trader or weighman who brings in exchange a *kuro* measure, or one representing the *kuro* in capacity, and they will be sold to the public at the rate of Rs. 2 a set. It will be no doubt a great convenience to the public if this reform could be carried out, but the Chief Commissioner will find considerable difficulty in dealing with the matter.

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The following is the report on the state of the season and prospects of the crops for the weeks ending 11th and 18th November 1885:—Good rain has fallen in the Madras Presidency during the last fortnight, and agricultural prospects are now good everywhere. In Bellary and Anantapore the condition of the crops continues to be favourable. In Mysore, where there was a fair amount of rain, the prospects of the season are favourable, and the standing crops are in good condition, except that in parts of the Tumkur and Bangalore district more rain would be beneficial. In Coorg prospects continue good. In the Bombay Presidency there has been rain in several districts during the fortnight under report. The reaping of the *kharif* and the sowing of the *rabi* crops continue. In the Berars the *kharif* harvest has commenced, and sowings have been resumed in the Nizam's Territories, owing to the break in the rains which has been beneficial to the crops. Prospects continue good in the Central India States, and *kharif* harvest and *rabi* sowings are in progress in Rajpootana. In the Central Provinces, slight rain fell in two or three districts and prospects continue favourable. Rain is much needed in some places in the Punjab, where none has fallen during the fortnight under notice. The *kharif* harvest is approaching completion, and the *rabi* operations are in progress. Seasonable weather prevails in the North-Western Provinces and Oudh, where *rabi* operations are still in progress, and have been completed in places. Agricultural prospects are good. In Bengal the rains have ceased, and the cold weather has set in. Outside the flooded tracts and parts of Behar, the rice crop promises generally an excellent harvest. The cultivation of *rabi* and *boro* paddy is proceeding well, and the harvesting of the earlier sorts of *amun* rice has commenced; but in Behar *rabi* and poppy sowings are backward for want of rain. In Assam agricultural prospects continue good. Crop prospects are good in British Burmah, except in the Prome and Thayetmyo districts, where there has been a deficiency of rain; the public health is generally fair. Prices are fluctuating in the Punjab and in Rajpootana, have slightly risen in Coorg, and are falling in Mysore. In Bengal the price of rice has fallen in several districts; elsewhere prices are generally stationary.

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A few weeks back we noticed the Arabian dye stuff called "waras," which is the product of a tree belonging to the natural order *Fabaceæ*. Mr. M. A. Lawson, the Director of cinchona plantations, parks and gardens, Nilgiris, in his report for 1884-85, gives an interesting account of this dye. He says:—

The resinous and powdery glands covering the pods of *Flemingia congesta* afford a very permanent dye, and much resemble in appearance the kamala of the Pharmacopœias. A proximate analysis of this substance gave the composition as follows:—

Moisture	3·44
Resins	73·10
Matters soluble in water	8·20
Cellulose	9·60
Volatile oil	trace
Ash	6·03
Total	100·37

The coloring principle resides in the resin which is soluble in ether, alcohol, benzol, chloroform, and caustic soda solution. When a concentrated ethereal solution was allowed to stand for a day it deposited a mass of granular crystals, similar to those discovered by Doctor Anderson in "kamala" (glands from the fruit of an Euphorbiaceous plant) When the coloring matter of waras was examined side by side with that of kamala by means of a spectroscope, the amount of absorption was identical in each case, all the spectrum was darkened throughout except the red end which alone was visible. A dye-bath was made of the waras and pieces of cotton, linen, wool and silk were immersed. The color formed was that of a bright orange-brown, and the tint obtained was much superior in the animal fabrics as silk and wool, than in the vegetable tissues of cotton and linen. In these respects it resembles the dyeing properties of kamala. As a commercial undertaking, however, it would not be profitable to collect waras, as the amount obtained from the plants is so small in proportion compared with the yield of kamala.

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Practical and undoubted testimony is what, in our opinion, is wanted to prove beyond a possibility of doubt whether the ensiling of fodder does or does not improve its feeding value. The experiments of General H. C. Wilkinson have shown that it does; and as this was the only instance on record of the experiment having been conducted on thorough and scientific principles in India, we have no hesitation in accepting the General's conclusions as accurate. The investigations of the Royal Ensilage Commission in England have also established the superiority, in a more or less degree, of the feeding value of ensilage over ordinary fodder. In the last number of the *Farmers' Review* to hand, there is a letter from the pen of Mr. G. D. Foristall, farmer on the State Farm, Tewksbury, Massachusetts, addressed to the *New England Farmer*, in which he gives his "ensilage experience." He says: "The capabilities of ensilage feeding over the old methods seem almost incredible." The experiments were carried on uninterruptedly for four years, and the writer goes on to say that, after this long trial of ensilage feeding, the conclusions arrived at are these: "that it is capable of trebling the stock capacities of New England, and can be used with great advantage, either in dairying or beef production. For the latter, the stock have all the advantages of summer feeding with grain the year round. If any doubt this statement, I would like to have them visit the farm, and judge for themselves whether these things be so." For further details of his methods of ensiling, &c., we refer our readers to his letter, which we print elsewhere.

THE forecast of the Cotton crop of the Central Provinces for the season of 1885-86, promises well. Mr. Fuller, the officiating Director of Agriculture, says that cotton is only a crop of commercial importance over a very limited portion of these provinces, and no details have been obtained for this forecast from eight districts in which it plays quite an insignificant part. During the years 1883-84 and 1884-85, the cotton exported from these provinces amounted in value to 17 and 10¾ lakhs of rupees respectively, and the proportions in which different parts of the provinces contributed to this export in the last-named year are roughly expressed by the following figures :—

Saugor, Damoh, and Jubbulpore	5
Nursingpore, Hoshungabad	11
Nimar	7½
Wurdha, Nagpore, Chanda, and Chindwara	12

Although an increase in the area is reported from most districts, Mr. Fuller takes occasion to remark that in estimating the character of this increase it must be remembered that its extent has been calculated on the areas of the preceding year, which were abnormally small, owing to the very unfavourable character of the season at sowing time. It is not believed, he says, that the area on which cotton is grown in these provinces, shows any tendency to permanent increase, while it is certain that in some tracts, noticeably in the Nagpore and Wurda districts, cotton cultivation is giving place to that of linseed The past season is stated on the whole to have been a good one for cotton, and estimates of out-turn below 10 annas in the rupee are probably under the mark. The rainfall at the end of June and commencement of July was not sufficiently continuous to hinder sowing, and there have been numerous breaks, during which weeding could be effected. The long break which continued throughout September may have harmed the crop in some places ; but it is certain that cotton suffered from the deficiency much less than any other crop. On the whole an outturn nearly, if not quite, up to the average may be expected. In two districts, Nimar and Wurdha, the full average crop is expected, *viz.*, a 12-anna crop. In two 11 annas, in three 10 annas, in two 8 annas, and in one 6 annas. From six districts no returns have been received, and apparently none are required, as cotton forms an insignificant crop in these.

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THE officiating Director of Agriculture has issued the following forecast of the rice crop in the Central Provinces for the season 1885:—Rice production is of commercial importance only in the southern and eastern districts of the provinces. Although there is a considerable area under rice in the north-west corner of the provinces (including the districts of Damoh, Jubbulpore, Mandla, and Seoni), yet the amount of rice exported from this tract is relatively insignificant. In eight districts the crop is of such little importance that it has not been worth while to obtain a forecast of its out-turn from them. The area from which the rice exports of the provinces are chiefly drawn includes the Chanda, Bhundara, and Balaghat districts in the Nagpore division, and the three Chuttisgurh districts of Raepore, Bilaspore and Sumbulpore. The amount of rice which these provinces exported during 1884-5 was rather over 12¾ lakh maunds, of which 3¾ lakh maunds were subscribed by the Nagpore, and 8 lakh maunds by the Chuttisgurh districts. The opening portion of the past rainy season was favourable to rice, and in most districts a larger area was brought under crop, than bore rice in the preceding year. There were several good falls of rain during the hot weather months which were of great advantage, since they enabled cultivators to break up land before the regular rains commenced, and so give it a period of open fallow in the hot season. Up to the end of August prospects were everywhere exceedingly favourable, but a break in the rains commenced then which lasted in many parts for nearly two months, and was only interrupted by occasional very local showers. The rice crop of course suffered severely, and it is rather a matter of surprise that its present prospects are so good as they are reported. In many places the break commenced very shortly after the seedlings had been planted out, when damp weather is especially wanted ; broadcasted rice (under which class falls all that grown in Raepore and Bilaspore) fared better, but a considerable portion of the crop on high lying ground will give but little return. Taking one district with another, the highest estimate which can be made is that of a two-third crop. The total area under rice in 1884 covered 2,980,291 acres. This exceeds the area under rice during the previous year by 40 per cent.

MAURITIUS SUGAR.

THE sugar industry has reached a crisis in Mauritius, and has called forth a paper by Mr. W. Newton, the President of the Chamber of Agriculture in that Colony, the object of which is to point out the dangers which threaten its sugar industry, and the measures he would suggest to remedy the depression of trade in general, and of sugar in particular. He takes a retrospective view of the question from the year 1878, when the English Antilles presented a petition to the Colonial Office, calling the attention of her Majesty's Government to the condition of inferiority to which the cane sugar produced by the Colonies of the English Antilles was reduced in relation to the beet-root sugar brought from France, Belgium, Holland, Austria, and Russia under protected bounties. He quotes valuable statistics showing the great advance the Continental beet-root sugars have made during recent years, and how prejudicially this has affected the cane sugar produced by the British Colonies, especially as the former were protected by foreign bounties. He refers fully to the remedy that has been suggested, *viz.*, that the British Government should either enter into negotiation with the sugar-producing countries for the abolition of these bounties, or if this failed, should levy a countervailing duty on bounty-fed sugars equal to the amount of the bounties. But these proposals fell flat, and the Government were pledged to resist the compensating tax. Mr. Newton says that the crisis through which the island is at present passing may be defined as the struggle between the beet-root and the sugar-cane, complicated with the struggle between free trade and protection ; and resolves itself into the question whether the cane is to capitulate to the beet-root. He points out the great superiority of cane sugar over that manufactured from beet-root, inasmuch as the former produces nearly twice as much sugar as the latter, from the same quantity of the raw material.

Mr. Newton's main object in addressing this paper to the Chamber of Agriculture is to rouse the people, particularly the planters and manufacturers, to a sense of the danger which threatens the sugar industry of the Colony. One of the chief remedies proposed by him is that the Indian Government should be asked to make it known as widely as possible, that no animal charcoal is used in the manufacture of Mauritius sugar, so that the people who are so largely ruled by religious prejudices may know that they can get Mauritius sugar at the same rate as other sugars, with the advantage that the former has no animal charcoal used in its manufacture, and for this reason ought to command the market in India. This point has been made known in India through the Madras Government. But Mr. Newton has overlooked one important point in this connection, *viz.*, the cheapness of supply. As far as we can make out, the natives of India are not at the present time much influenced by this consideration, *i.e.*, religious prejudices. Western civilization has done much to remove those religious scruples which a few years back ruled the consumption of foreign productions. Moreover, sugar factories are established in India itself, and animal charcoal forms an important factor in the manufacture of our white sugars. Some opposition was at first made to this, but recent years have seen this much reduced, and sugars manufactured with animal charcoal are as extensively used now, as they were excluded some years back. The consideration which mainly governs the Indian market at the present time (and sugar is no exception to the rule) is the cheapness of supply ; and unless the Mauritius Government can offer advantages in this respect, there is little chance of their sugars finding the very ready market which they anticipate. Again, it must not be forgotten that India is a sugar-producing country, and that its export trade may yet assume proportions when, instead of being a sugar *importing* country, it will again become a sugar *exporting* country on a large scale.

TIL CROP, CENTRAL PROVINCES, 1885-86.

THE *Central Provinces Gazette* of the 14th instant contains a forecast of the Til crop for the season of 1885-86. Mr. J. B. Fuller, the officiating Director of Agriculture, sums up as follows :—

Speaking broadly, til represents the contribution towards the provincial exports which is made by the poorer classes of soil, and is to a great extent a speciality of hilly ground, on which wheat or linseed cannot be grown to much advantage. The tract in which most til is grown is the Nimar district, but as most districts in these Provinces include a considerable area of rocky land, til is a crop of some importance throughout the Provinces. Its commercial importance may be judged of from the fact that during the year 1883-84, its exports amounted to over 9 lakhs maunds, with a value of 34½ lakhs rupees, rather more than the value of the *rice* exported in that year.

The appended table contains a column which professes to show the area under til in each district during 1884-85—in thousands of acres. It must be remembered that, owing to the imperfect agency which has hitherto been at our disposal for crop registration, these figures are mere estimates, and I have given them more with the object of indicating the *relative* importance of different districts as til producers than with any idea of showing the actual area under til.

It will be noticed that the area now under til is very considerably in excess of last year's area. The increase is principally due to the fact that last year's area was abnormally small, owing to the continuous rain-fall having prevented sowings. Last year the til crop was a very small one, and the exports during 1884 85 only amounted to 2,60,781 maunds against 9,02,675 maunds in the preceding year. But there are also signs that the cultivation of til is gradually extending, and the Deputy Commissioners of Nimar and Wardha notice the effect which the brisk demand for til has had on the area. It seems, like linseed, to be encroaching on the area which has hitherto been sown with cotton.

The greater part of the til crop is sown in August, though in the southern districts, some is sown in October, and grown as a cold-weather crop. Breaks in the rainfall of August are, therefore, essential for the success of the crop, as seed cannot be got into the ground during continuous rain. It was the absence of breaks in August that made the 1884 85 season so bad a one.

The weather during last August was, on the whole, propitious for til sowings, though it is reported that the rainfall was too heavy in Mandla and Seoni. But the abnormally long break which prevailed throughout September and till the end of the first week in October has done the crop a great deal of damage, and, though some of the district estimates are probably below the mark, the outturn cannot be expected to exceed 9 or 10 annas in the rupee, taking 12 annas to represent an average crop.

The table referred to in the second paragraph we have been obliged to omit ; but the following figures will give all the necessary information on the subject :—

	Approx. Area. Acres.	Percentage. Acres.	Estimate outturn. Annas.
Saugor	36,000	+ 5	5
Damoh	18,000	+ 45	6
Jubbulpore	40,000	+ 11	7
Mundla	15,000	+ 1	6
Seoni	15,000	+ 4	7
Nursingpore	11,000	+ 4	9
Hoshungabad	17,000	+ 15	8
Nimar	36,000	+ 3	9
Betul	22,000	— 1	7
Chindwara	18,000	+ 3	7
Wardha	20,000	+ 62	8
Nagpore	27,000	+ 23	9
Chanda	40	+ 10	10
Bhundara	...	...	..
Balaghat	...	...	...
Raipore	10	+ 45	12
Bilaspore	9	+ 86	7
Sumbulpore	...	...	...

The first column of figures represents the area under til in 1884-85 ; the second, the percentage by which area now under exceeds (+) or falls short (—) of that of the previous year. The third column represents the outturn of the crop in annas per rupee, 12 annas being equal to an average crop.

MANUFACTURE OF MAHUA LIQUOR.

[*Communicated.*]

CURIOSITY prompted the "inquiry," from the result of which I have been able to glean the following facts and figures relative to the manufacture of an ardent spirit, which is more extensively consumed than any other spirituous liquor in India. I refer to the *Mahua* spirit which is manufactured from the flowers of the tree of that name, which is botanically known as *Bassia latifolia*, and has a wide distribution—including the Northern Circars and other parts of the Madras Presidency, Western Bengal, Central India, the North-Western Provinces and Oudh, and elsewhere. The tree is middling sized, with very numerous branches, the lower ones spreading horizontally. The flowers, which have a high economic value, are so plentiful that as much as 25 to 30 maunds may be obtained from a single tree in one season. They not only serve as an article of food for the wild tribes in the Central Provinces, and poorer classes in other localities, but afford the desideratum—innate here as everywhere—for strong drink, which would almost appear to be a necessity for human existence. The flowers are eaten raw by the natives and have a sweet spirituous taste ; but owing to their strong and peculiar smell, they are generally considered a nuisance by other than those who have acquired a taste for them by use. The mahua flowers have already attracted the attention of European spirit manufacturers, and, if I mistake not, figure in our export trade. Drury states that the spirit distilled from them, when carefully obtained, resembles good Irish whiskey in taste. But however this may be, I can safely say that the smell is most revolting, which, my informant asserts, can be overcome by admixture with aniseed.

With these preliminary remarks, I will proceed with my notes of a visit to an "outstill," situated on the western confines of the Burdwan District in Bengal. This establishment was on the roadside along the Grand Trunk route, and combined at once distillery and shop. The licensee made and sold his liquor at one and the same, and the supply was always produced as per demand. He obtained his right by open competition at the public sales of these concessions, and had to furnish an amount equal to two months' rent as a guarantee of his *bona fides*. Over and above this security he has to pay his monthly rent in advance ; so that on the whole, the executive is well secured against all contingencies. The "permit" provides that the operations may be carried on only during the day, *i.e.*, between sunrise and sunset, but vending may continue beyond this period up to 9 P.M. It also provides that no liquor shall be sold to soldiers ; restricts all transactions to cash —no trucking ; precludes any one person from purchasing more than one gallon or six quart bottles of liquor per diem ; prevents gambling on the premises ; and warns the licensee against encouraging bad characters. A sign-board is indispensable, and the privilege of manufacture and sale is non-transferable. Moreover the Abkarry authorities can have free access to the books and accounts at any time ; the penalty for failure in respect to any one of all the above obligations is forfeiture of license and perhaps prosecution. On the other hand, the licensee may make as much liquor as he can sell, and has full liberty of action as regards the price and strength of his liquor. The only embargo placed upon him is that he cannot have more than *one* still, nor distil more than *ten* gallons of spirit at a time. This is not a hardship, for production takes place at the rate of a fresh relay, when necessary, every half-hour, if sufficient "ferment" be forthcoming. The *modus operandi* is simple :—A maund of mahua flowers thrown into 18 gallons of water and the mixture allowed to remain for four or five days according to the season of the year. This "ferment," is next passed into a large iron vessel, embedded in clay and fixed over a fire-place. The "worm" is a bamboo covered with coils of rope-fibre, and the "receiver" an earthenware vessel of half the capacity of the cauldron. These primitive appliances suit their rude purpose roughly well. The first operation generally occupies an hour, and takes about two annas worth of firewood, but all subsequent operations only require half this time, with a corresponding reduction in the item of fuel. The outcome from 18 gallons of "ferment" (derived from one maund of mahua flowers) is 10 gallons of spirit, comparatively weak, which is divided with an equal quantity of water and retailed at 9 pies per bottle to those classes of natives who have no caste objection to alcoholic indulgence. The maund of *mahua* flowers at present costs As. 14 ; but the price ranges from As. 10 to Rs. 2-8-0 per maund, according to circumstances. When the flowers are scarce or unprocurable, *goor* is substituted, totally or partially, in the proportion of 3 seers of *goor* to 4 seers of *mahua* flowers. *Goor* is the dry unrefined country sugar obtained after boiling down the juice extracted from sugar-cane. It sells at from Rs. 1-8 to Rs. 3 per maund. I may mention that the ten gallons of liquor obtained from the receiver is not *spirit* in the usual acceptation of the term. The first three gallons of liquor distilled is only *proof spirit*, the subsequent seven gallons being of little value from an alcoholic stand-point. But it comes in for "mixing." The first product of the still mentioned, when sold without adulteration, fetches as much as 4 annas per bottle, or just as much as a gallon of the common liquor.

In conclusion, it is only necessary for me to add that the *seeds* of the *Bassia latifolia* yield a large quantity of oil by expression, which is used for burning in lamps as well as for adulterating *ghee*, which it somewhat resembles, being of a thick consistency. It is sometimes used for culinary purposes by the poorer classes. In the "Materia Medica" of the Hindoos, this oil is recommended to be applied to the head in cephalalgia. The same authority also says that the distilled spirit obtained from the flowers "is described by Susruta as heating, astringent, tonic, and appetising." The wood is hard, very strong, and as the tree grows to a height of 40 feet, may be utilised for a variety of purposes.

MAHUA FLOWER.

Miscellaneous Items.

The fears of famine in China are disappearing, and the country is quiet. The Empress has publicly declared her intention to open out the country with roads and develop its mineral resources gradually. Reforms in the administration will be undertaken shortly on all sides. Formosa will have a separate Governor, and the island will be opened by roads, fortified, and its mines worked.

We understand that the Nilgiri Brewery has obtained the Government contract for the supply of malt liquor to the British troops in Burmah, and that under this arrangement the Company will have to supply 4,500 hogsheads annually for the present. This Brewery now has agencies at Bangalore, Madras, Trichinopoly, Secunderabad, and Kamptee, and it is in contemplation to establish Breweries at Cadgoody, in Mysore territory, and at Kamptee, but whether this will eventually be carried into effect remains to be seen.

The potato, cabbage, turnip, wheat, barley, oilseed, &c., crops are in full swing. New potatoes from Benares are now procurable in the market, although very dear—2 annas a seer. When they become cheap they are sold at 2 pice per seer. Onions and spices are also very dear. We hope to get new cabbages with in a week. Oranges are very rare in the market.—A few showers of rain are very much required, and would do a great deal of good to the standing crops.—The *tals* and the Ganges are now full of wild ducks and geese. Indeed this is a capital season for shooting.—Fever and coughs are still raging in the city.—Thefts are of every-day occurrence.

At the end of July last, Mr. L. R. Burrows, Collector of Nilgiri, wrote to the Board of Revenue, to ask if the concession sanctioned on 30th October 1883, on behalf of cinchona cultivation, could be held to apply to lands held under permanent puttas, issued under Standing Order No. 38. "The Board are aware that, until recently, permanent puttas are granted in the case of lands devoted to agricultural purposes, as well as lands occupied as building sites, and it will also be seen that in many cases large holdings have been permanently assessed at very low rates of assessment, to the detriment of the interests of Government. For this reason I think that it is unnecessary to extend the concession to lands held on permanent putta." The Board resolved that—"The concession, granted 30th October 1883, is only a temporary indulgence, which was conceded in consideration of the depressed state of planting interests, and although it does not extend to estates held under the waste land rules, the Board recommended that it be declared applicable to land held on permanent putta. Although the assessment of holdings under permanent putta was not revised at the recent settlement, and although some of those holdings are very lightly assessed, this is not necessarily the case with all, and revision at settlement would probably not have entailed enhancement of assessment in all cases." The Board's recommendation was accepted by Government.

Selections.

ENSILAGE EXPERIENCE.

As I have frequent inquiries by letter and otherwise as to the success of ensilage feeding at the State Farm at Tewksbury, I thought perhaps your readers might be interested if I should give an account of our experiments, and what success we have met with in a practice of about four years in that direction. The first experiment was last season. when milk from the different lots of cows was tested at two different times, one lot being fed with good English hay, the other on ensilage. The ensilage-fed cows' milk analyzed quite one per cent more solids then the hay-fed, the same quantity of grain being fed in each case. The next experiment was to determine whether sweet ensilage could be obtained by a process of slow filling and not tramping, simply keeping the mass level. This experiment, so far as sweet ensilage was concerned, proved a failure. The silo contained 350 or more tons. The mass, after a few days, rose in temperature from between 80 and 90 degrees, when we first commenced to fill, to 140 degrees ten feet, and 150 degrees one foot below the surface. It remained at this temperature for nearly a month, when the mass gradually cooled down to about 90 degrees and there remained.

As we were nearly four weeks in filling, there being intervals of of four or five days between some of the filling to allow the temperature to increase, we have concluded that bacteria were not created to be destroyed in that way. The ensilage obtained was as good as any I ever saw, but somewhat acid, and the microscope disclosed bacteria. I do not ascribe its goodness to going through this heating process, but to its having been allowed to get well along toward maturity before being cut in the field, the ears being well along in the milk. When corn is cut into inch pieces or less, so large an amount of mutilated surface is exposed to the atmosphere, that it makes the very best condition possible for the formation of ferment, and as ferment is caused by bacteria, and as they are not destroyed by any degree of temperature which would be likely to arise by process of slow filling, cut ensilage must be more or less acid according to the degree of maturity when taken from the field.

In an adjoining silo 250 tons of corn fodder was put in whole, in the same state of maturity that the cut was. This came out perfectly sweet and has kept so well that we are feeding it at the present time, August 10. This in my opinion, is the only way that sweet ensilage can be obtained, namely by putting in the product to be ensilaged without injury to the cells of the plant, cutting the crop up as it is fed from the silo. There was rather more waste at the ends in the uncut ensilage than from the cut. This waste can be prevented in the future by keeping the ends weighted at night during the process of filling and keeping those ends the highest during filling, as the ends do not fill as solid as the centre.

In changing from acid to sweet ensilage there was no perceptible change in amount or quality of milk, or in the avidity with which it was taken by the stock. Cut in foot lengths there was about four bushels per day of waste butts at two feeds, from a herd of forty cows. When cut fine the waste is all eaten. The capabilities of ensilage feeding over the old methods seem almost incredible. From fifteen acres of heavy corn and ten acres of light, which, if it had been properly matured might have been grown upon five acres, there were kept at the State farm seventy-five head of cattle from early in November to the middle of May. Since then about forty cows have been fed, and will continue to be fed until past the middle of August, with the addition of thirteen cents worth of grain, consisting of two quarts of cotton seed and four quarts shorts per day, and not a pound of hay or any other feed. A more healthy looking herd I never had to do with. To make sure that their looks were not deceiving as has been claimed by some that this good appearance might be upon the same basis as the flesh or bloat of the beer drinker is produced, the stomach of every animal slaughtered has been examined, and in every case been found to be in a perfectly healthy state, and this after four seasons of feeding ensilage. The herd averaged full 3,100 quarts of milk last year per cow. Now after this long trial of ensilage feeding the conclusions arrived at are these: That it is capable of trebling the stock capacities of New England, and can be used to great advantage, either in dairying or beef production. For the latter, the stock have all the advantages of summer feeding, with grain, the year round. If any doubt this statement, I would like to have them visit the farm and judge for themselves whether these things be so. I have a field of corn now growing which is wonderful to look at, and which will undoubtedly produce thiry tons of fodder per acre early in September; there are nearly twelve acres of it. The corn can be put in silo at your convenience, only do not let time enough elapse between the fillings to allow decay to take place on top, which will commence in four or five days, before another layer is put on. This is a very important fact to know, as it saves a great expense of extra help and team work, which has been thought essential to insure success. The corn can be put in whole or cut, with good results in either case. If a farmer can afford the power and help necessary to cut the corn at time of filling, perhaps it is as well to cut it up at that time, if having it acid is no objection, and I think it is not.

The advantages of putting corn in whole are these: It takes less time and help; less cost of machinery, which is a great item with those of small means; it enables the farmer to take the more leisure time of winter to cut the corn up as wanted. If the corn is put in all one way and kept straight, there is no trouble in taking it out by cutting in four or five foot lengths with an axe and then running it through a common hay cutter every part will then be eaten. This season, by way of experiment, I have twelve acres of southern white corn, 8 acres of marble-head mammoth, and fifteen acres of common field corn, all to be used for ensilage, but the field corn will be allowed to mature the grain before the stover is ensilaged, but still will have too much moisture in the stock to keep well in the mow. Good results have been reported of this last plan.

GEO. D. FORISTALL,
Farmer at State Farm, Tewksbury, Mass.

—*New England Farmer.*]

WHEAT AT ROTHAMSTEAD.

SIR J. B. LAWES has published his annual statement of the wheat crop on his experimental farm at Rothamstead, where agricultural observations have now been continuously made for 42 years. So far as the results at Rothamstead may be accepted as illustrative of the general harvest of the country, they afford little that is encouraging to those wheat-growers in India and elsewhere who have been for so long waiting in hopes of a livelier English market. The rainless months of July and August were exceptionally favourable for ripening the crop and for harvesting operations. Sir. J. Lawes considers that in few instances has there been a more rapid and cheaper in gathering of the harvest. The crop itself, however, had suffered somewhat from the variable weather in June. Wheat has, Sir John says, this peculiarity that it never wholly fails, but hardly ever realises perfection. Only twice in the course of 42 years has there been what may be called a first rate crop at Rothamstead. Wheat requires a steady and progressive increase of temperature during the whole period of its growth. But in June there were great fluctuations of heat and a fall, on one occasion, of as much as 20 degrees. The crop was, nevertheless, a fine one. The unmanured plot, on which wheat has been grown, without any manure, continuously for 42 years, yielded nearly 15 bushels per acre; the plot dressed with farm-yard manure gave the high ratio of 40½ bushels per acre; plots dressed with various artificial manures ranged between 31 and 36 bushels. The striking characteristic of the year was the large difference between the yield of the farm-yard-manure crops and those artificially manured, which averaged 7 bushels per acre. Applying these figures to the wheat average of England, we should get from 2½ millions of acres, after deducting 2¼ bushels per acre for seed, a total of 8¾ million quarters for consumption. The amount requisite for consumption in the current year will be 25,860,000 quarters. The home yield, accordingly, must be supplemented by something over 17 million quarters of imported wheat. Last year England imported 18 millions of quarters against the estimated requirements of 16,300,000 quarters. There must, therefore, be large stocks on hand, and the probability of any improvement in the market is as remote as ever. Meanwhile the present rate of exchange, taken in connection with ruling Indian prices, gives the Indian exporter as against the English farmer a bonus of over five shillings per quarter as compared with the state of things when silver was 8d. per oz. dearer! This is a calamitous result for English farmers, whose occupation, so far as wheat-growing is concerned, may be said to be gone. On the other hand, the fall in the prices of sheep in the North of England within the last two years has been something portentous for the stock owner. For some classes of sheep it has been as great as 46 per cent, and the mean fall on all sorts is over 40 per cent. On the whole, the prospects of the English farmer were never darker. Should he and the newly enfranchised agricultural labourer awake to the fact that the competition which has ruined their business is fostered by the rates of exchange ruling between England and the silver-using countries, we may expect the bi-metallist controversy to enter upon a new and very decisive phase. Nothing, however, can be more certain than that England by her present currency arrangements, by enhancing gold and depreciating silver, offers a distinct premium to the silver using countries on their exports and an equally distinct discouragement to their imports—two results from which the English farmer and the English manufacturer are, in the nature of things, the first to suffer. At present the popular belief in England is that the only sufferers from the depreciation of silver are the Indian Government and its officials. The calamity is, accordingly, endured with the proverbial resignation that is felt for other people's misfortunes. Practical Englishmen will feel and act very differently when they learn, as they assuredly soon will, that the main brunt of the burthen is falling on themselves.—*Pioneer.*

HOW MUCH SEED TO THE ACRE.

IN some crops farmers have learned that over-seeding, by causing the plants to crowd each other, lessens the crop, and have adopted about uniform methods of seeding. Thus, in the corn crop of the west we plant three feet nine inches to four feet apart each way, calculating upon three to four stalks to the hill, experience having demonstrated that this distance and amount of seed will give the best results. With the small varieties of corn grown at the East closer planting is permissible, and with the larger varieties south still greater space must be given. But when we come to the wheat crop no such standard rate of seeding is established. Some contend that two pecks per acre is sufficient, others double this quantity, and others still sow all way from one to two bushels per acre; the larger number, however, using about five pecks. In planting corn each hill is put in such manner that if the seed is good it will grow. In wheat it is different, as ordinarily grown quite a percentage of the wheat fails to make healthy plants from the imperfect manner in which the seed bed is prepared. If the same care were taken to provide each seed with proper conditions for germination and growth as in corn, it is quite certain that a less amount of seed would give better results than are now obtained from the seeding of from one to two bushels per acre. The *Colorado Farmer*, of a recent date, has a letter from a farmer on this subject of the proper amount of seed-wheat to the acre, which is referred to Prof. Blount, of the Colorado Agricultural College, for comment. The farmer says that of land in the same field and under the same treatment, and seeded at the rate of 60, 75 and 90 pounds of seed to the acre, that which received 90 pounds was the thinnest on the ground and every way the poorest crop. There was little apparent difference between that which received 60 and 75 pounds per acre. But in the centre of the field, where the 75 pounds per acre was used, there was a strip 100 rods long on which the drill made five rounds sowing but 37½ pounds per acre. The only test of this yield, in comparison with that seeded at the rate of 75 pounds per acre, was by counting the bundles made, 100 rods and back, with an automatic binder, and in weighing fifteen bundles of each. The number of bundles was the same, and the weight varied but fifteen ounces in the fifteen bundles in favor of the thinly sown grain. Prof, Blount, in commenting upon the above results, says:

"For years I have advocated thin sowing of wheat under nearly all circumstances and in nearly all soils. Thirty pounds is enough if it be sound and pure and sown at the proper time. Not only in 'highly cultivated,' but in all land will 30 pounds do better, yield more and make finer grain than 60, 90 or 120 pounds of the same seed in the same soil. This is specially true such seasons as this when hot suns follow damp nights and frequent showers. Thin sown wheat, oats, barley and rye always stool better and have fewer short stalks and heads at harvest. When crowded so they cannot carry out their natural habits of tillering, the whole crop is enfeebled and consequently the grain deteriorates.

"I know of many who have thoroughly tested thin seeding, an account of whose success I will write up so soon as threshing is done. On the college farm for seven years I have raised over 300 different kinds of wheat, at no time sowing more than 30 pounds per acre. With the exception of 1883, when the hail destroyed the crops, every pound sown has produced from one to three bushels. * * * * The difference of opinion existing among farmers as to 'how much seed to sow per acre' arises from various causes. Most men do not sow less than 90 pounds for fear of not 'getting a good stand' Others sow the same quantities their fathers did, never once thinking of another way, while others contend the more seed the larger yield. On the other hand, a careful study of the wheat plant has convinced more than one farmer that seeds crowded too closely, like two waves coming together destroy one another, and that the soil too densely shaded degrades the grain. It is a fact not often noticed or well known that when, two grains of almost any seed are placed side by side in the soil one will destroy the other, hence the small yield from thick seeding. Every farmer who persists in sowing 90 pounds, in my opinion, throws away a bushel of wheat to the acre. He throws away enough bread to feed his family the year round."

Waldo F. Brown, an Indiana farmer, and well known agricultural writer, in a letter to the *National Stockman*, says:

"I am satisfied from several years' experience that one bushel of small grained wheat like the Fultz, sown on a rich, well prepared soil, will give as large a crop as the land is capable of producing. I have grown an average of thirty bushels to the acre on a field sown with three pecks of seed, and am an advocate of thin seeding if the land is in the best condition."

Farmers who have wheat yet to sow this fall can easily test for themselves the value of thick or thin seeding by sowing strips through their fields with different amounts of seed, and carefully noting the result during the season of growth and at harvest.—*Farmers' Review.*

INDIAN AND CHINESE SILKS.

TO THE EDITOR OF THE "ENGLISHMAN."

SIR,—Your contemporary the *Pioneer* devoted two columns the other day to certain proceedings of the Agri-Horticultural Society of India. Speaking of silk your contemporary displays a confusion of mind that is simply appalling. One sentence seems to refer to tusser silk and the next to mulberry. The writer says:—"At present India sells little but cheap 'waste silk'; whereas from Shanghai alone the French last year bought 8,000 bales of reeled silk. What makes this inferiority of India to China the more dispiriting is the fact that the keen-witted Chinese are simply acting on advice given over and over again by Mr. J Wardle." Now, were these 8,000 bales tusser silk or mulberry? The commercial term "waste silk" seems to be the key-note for our contemporary's humble opinion of the India silk industry It is unfortunate that commercial terms often convey a wrong meaning to the uninitiated. I have never heard that Indian waste silks compare unfavourably with the waste silks of China; but here the writer is evidently comparing China reeled silks with Indian wastes. I have given very special attention to this subject, and I should be indebted to the *Pioneer* for an enumeration of the leading suggestions made by Mr. Wardle. If the Chinese have been able to take advantage of these while our Indian cultivators have not, I fear the Indian press must be held in a measure to blame, since I make bold to say that no such suggestions by Mr. Wardle have ever been given in the public papers. But the question is, do they relate to mulberry or tusser, and do they refer to cultivation and rearing or to reeling? I have seen Mr. Wardle's pamphlet on the "Wild Silks of India"—a useful and convenient compilation of all that has been written on the subject of Indian wild silks, but I was not aware of any definite proposals or suggestions made by Mr Wardle, and shall be much indebted to the writer if he would publish them.

But to continue the quotation:—"It is needless to point out the advantage possessed by this country over Europe in the matter of climate. Both the food plant and the silk-worms develop and multiply at a rate impossible in more temperate climes." Again, I ask, does this refer to the tusser or to the mulberry silk? If to the former, it is needless to say that to talk of the superiority of India over Europe is absurd, since the tusser cannot live in any part of Europe. The passage must therefore be held to refer to the mulberry, and it is strangely belied by the present stagnation of the mulberry silk industry. Observe that, from the prosperity of a part of the Chinese tusser export trade, a comparison is made with the Indian mulberry, and the superiority of India is extolled. For tusser India most decidedly is superior to any other country; it is the home of that worm, the cultivation of which has only within modern times spread to China But for mulberry silk India is most unquestionably inferior, and the remarks I have quoted are sheer nonsense. The mulberry worm no doubt can be reared in India, but it is an exotic, and so also is the plant it feeds upon. We have several indigenous mulberry trees in the hills, but all are inferior to the white mulberry of Europe, and on the plains of India the indigenous species are as much exotic as the European plant. Attempts to conquer the obstacles offered by the Indian climate have been conducted for over 100 years, but we are as near success to-day as we were 50 years ago. The future for India in the silk market lies in a development of her wild silks,—the tusser, eri, and munga, and in working these China deserves imitation. I have always understood, however, that the success of the Chinese tusser was almost solely due to the large operations of Mr. Lister, of Bradford. As for Mr. Wardle's share in the matter, it is not as yet known to the world.

HORTICULTURIST.

COCA AT THE SOURCE OF SUPPLY.

THE Government organisation of the United States has been utilized to ascertain where the best varieties of coca are found, the best mode of preparing it for transportation, and how it can be brought within reach of the American purchaser. Dr. Squibb has had access to the reports received, and has communicated with his own correspondents. He has received a bale of coca from Bolivia by way of the tributaries of the Amazon and Para, but it had been ill-packed and was badly damaged.

Messers. V. Farfan & Co., of La Paz, Bolivia, is one of the best and largest houses dealing in the article at the centre of the coca trade of Bolivia. Peruvian coca is smaller, narrower, thinner, and more fragile than the Bolivian; and a small proportion of the leaves want the characteristic faint lines forming a narrow ellipse with sharp ends on the underside of the leaf. Peruvian coca is bright green when fresh, changing to a "duller, lighter, yellowish green"; Bolivian, is a dull, deep, olive green on the upper side, much lighter beneath, and becomes yellowish brown or brown. The two varieties shade off into each other, and both are divided into wild and cultivated, the latter being most esteemed.

The tree is cultivated on hill-sides 3,000 to 6,000 feet above the sea-level, on terraces on the sides of deep narrow valleys. The seed is sown in August in beds or boxes, transplanted in June to the terraces about 3 feet apart. The soil must be rich and free from shade and weeds, and is rapidly exhausted. The shrub grows to the height of from 2 to 6 feet, but the largest do not yield the best leaves. The crop is gathered, leaf by leaf, by Indian women and children. The first gathering, called the March crop, commences in January, the Saint John crop begins in May (St. John's is Midsummer day). All Saints' crop is collected in October, and then the shrub is completely stripped of leaves. Great care is taken not to touch the top of the bush. The leaves are dried in thin layers on hot pavements exposed to the sun, four hours' exposure being generally sufficient. They should not be laid out till the stones are quite hot They are then packed for transportation across the mountains, and must be kept cool and dry. They are rarely handled or transported in damp weather or during the rainy season, which lasts from January to April. The only safe way of transporting them is in soldered tin or zinc lined cases. Salaverry, the port of entry of Traxillo, is the principal place of export of the Peruvian drug, Arica of the Bolivian, Mollendo being now closed by the civil war in Peru.

The Peruvian Government records a production of over 15,000,000lb. per annum, the Bolivian Government 7,500,000lb. Of the latter quantity, Mr. Gibbs, the United States Minister at La Paz, says about 55 per cent is consumed in Bolivia, 15 per cent each in the Argentine Republic and Chili, and 10 per cent in Peru, while the remaining 5 per cent, or 375,000lb, is exported to the United States and Europe. If Peru exports the same proportion, the quantity received by the United States and Europe would be about 1,125,000lb. The market report in New York is that one manufacturer of cocaine in New York and another in Europe have secured the entire crop for the year, while a third has secured "the remainder." A million pounds would yield at least 2,500lb. of cocaine, while a fourth of that quantity would probably overstock the world.

Hon. S. L. Phelps, United States Minister to Peru, located at Lima, states that on a plantation producing good coca it is sold in packages of about 14 oz., at a price which—including tins, packing, and transport to the seaport—is equal to $31·75 per Spanish quintal, or about 32c (1s 4d.) per lb. on shipboard. Minister Gibbs states that the price in Bolivia varies from 20c. to 64c. per lb. The whites of these countries seldom use coca except as infusion, and then the first water is thrown away as being too strong. The habitual use of coca is said to prevent toothache and preserve the teeth. There is no evidence that the enormous demand in Europe and America has caused the slightest increase in Peruvian and Bolivian prices! Dr. Squibb points out that a drachm vial of a 4 per cent solution will last the ordinary practitioner a long while, and he asserts that it is highly probable that every manufacturer in the United States is overstocked with alkaloid With coca yielding 4 per cent of alkaloid, or 28 grains per lb., at a moderate price, cocaine could be sold at 15c, per grain, and any one of the four manufacturers in the United States could supply the whole demand. The Medical Department of the Army offered to contract for 2,000 grains. The competing bids were 18c., 19c., 19½c., 20c., and 22c. per grain or thereabouts. In consequence Dr. Squibb reduced his price to 20c., less 10 per cent.—*Chemist and Druggist.*

HYDROCHLORATE OF COCAINE.

Dr. Freud, of Vienna, published in August a research on the alkaloid, which stated that it caused local anæsthesia of the tongue. Dr. Koller argued that if it deadened the sensibility of the nerves of the tongue, it would have a similar effect on the nerves of the eye. After many experiments on animals, on himself and friends, and afterwards on patients, he published his discovery at the Heidelberg Ophthalmological Congress in September.

We will give a short account of the results that seem to have obtained in various departments :—

The Eye.—One or two drops of a 4 per cent solution instilled into the eye cause at first a stinging sensation, lasting a few seconds. On repeating the application there is a sensation of cold, then comes a feeling of weight or tension and dryness. The eye protrudes somewhat. If the instillation is repeated, the pupil dilates. Five minutes after the first instillation the cornea can be handled quite roughly, cut, cauterised with silver nitrate, pitted by pressure, without causing the slightest pain or even sensation. There is simply no feeling. When deep incisions are made, as for iridectomy, pain has been observed by some though not by others. It is as yet doubtful how deeply the anæsthetic effect can be made to extend; it passes off at the surface in about twenty minutes, and, as it apparently takes time to reach the lower structures shown by the dilatation of the pupil, it would seem that the application must be repeated to obtain the best effect. The eye remains dilated for some time, but vision is not interfered with, and the eye gradually returns to its normal state. We find reports of three cases where inflammation has occurred after the use of the drug among a very large number, in which it was not observed. One patient who had undergone two iridectomies under ether had the globe of the eye excised by Mr. Carmalt Jones, under the influence of a 2 per cent solution of cocaine. His remark was that it was a great deal better than that beastly ether.

Eyelid.—Mr. Bader has crushed a tumour on the eyelid without causing pain to the patient.

The Tongue.—Mr. T. Smith applied a 20 per cent solution to the tongue of a patient three times within ten minutes. He then applied fuming nitric acid freely two or three times, so as to produce a definite burn. No pain was felt during the operation.

The Nose.—H. J. Butlin records his own experience. He has twice had the turbinated bones of his nose burned by Dr. Semon, at intervals of three weeks. The first operation caused intense pain and prostration. At the second the surface of the bones was painted thoroughly twice over with an interval of five minutes, with a twenty per cent solution of the hydrochlorate. "The effect was marvellous, far more so than I or even he, I think, expected. The burning was not felt by me more than the introduction of the brush in painting. I cannot say I did not feel the operation, but the sensation must be described as feeling, not pain."

The Larynx.—Dr Semon has also removed growths from the larynx of a lady in whom, at the seven previous operations, the mere introduction of the instrument had caused alarming shocks. After painting the interior of larynx with the 20 per cent solution once, and waiting five minutes, he was able to introduce the instrument four times, and remove considerable portions of the growths, without the patient experiencing any pain at the moment, or subsequent shock hypodermically.

Messrs. J. H. E. Brock and C. J. Arkle, of University College Hospital, have tried the effect of hypodermic injections. The effects which were common to all the injections were smarting, followed by numbness ; redness round the point of injection ; in from two to three minutes, sensation to touch was diminished, to pain and temperature completely abolished. In every experiment except the last, when half grain was injected into the forearm, the anæsthetic area was more extensive immediately above the point of injection than below. The extent of surface on which the above effects were produced was about half an inch above and a quarter of an inch below the point of injection ; while for about half an inch around this area there was a slight diminution to tactile, painful, and thermal impression. They have performed two minor surgical operations painlessly after an injection of one-seventh of a grain.

We have given only some of the more striking pieces of evidence that have been brought forward.

Dr. A. Hughes Bennet makes a suggestive remark. He says that in an investigation undertaken in 1872, he demonstrated that the physiological properties of these caffeine, theobromine, guaranine, and cocaine, when administered hypodermically, were to all appearances the same. "Should it be proved that they have also similar effects when applied externally to the mucous membranes, it would be of importance from an economic point of view, as cocaine is extremely expensive, while the others are comparatively cheap."—*Chemist and Druggist.*

TRAPPING PIG.

"F.O.L." sends to the *Indian Forester* a recipe, and an apology for trapping wild pigs. It can easily be comprehended that in many districts pigs are an intolerable nuisance, and any method of getting rid of them all at once would be highly acceptable to the agriculturists :—

Cases are not rare where the disforestation of flourishing plantations has been considered necessary in order to deprive the black-coated gentry of their zanana-khanas and nurseries. They, too, often make themselves intolerable to the cultivators, and even a keen forest officer cannot help sympathising with poor Panjabi Sing or Jack Burman, who, driven to despair and wrath, fires the forest home of his black enemies. The poor chap is probably run in and punished, and the plague he tried to combat gets worse than ever, as a new and denser crop of grass springs up after the fire, which killed the trees, but did not destroy the grass roots. All the time, nothing is more easy than to catch every pig, in even a large forest ; and this is how it is done.

Select a nice, quiet, retired spot to build your trap. The trap is built in the form of an oval, the longer diameter some 40 feet, the shorter some 30 feet in length. It is constructed of closely fitting palisades with the bark left on. They should be at least 2½ feet in the earth, 7 feet above ground, and sufficiently strong to stand the simultaneous charge of a score or more of pigs. The trap has two heavy sliding doors, exactly opposite each other. Experience has shown that this facilitates the catching immensely, as the old sows, which are the most suspicious, apparently feel safer between two open doors, and do not so frequently give the signal for a bolt. A side door on the same principle, ending in a funnel-shaped passage with another small outer door, serves to transfer the pigs into cages for transport. These sliding doors can be set in such a way that the pigs either catch themselves, which however is slow work, and only to be recommended when a few stray pigs are still to be caught, or the spring can be pulled off by a man, and the whole sounder may be trapped at once.

The pull-off is similarly constructed for either purpose. The wire and the rope end holding up the sliding doors must run over large well-oiled wheels. These rope ends terminate in a smooth iron ring, and the ring, when the doors are set for a catch, if hooked on to a smooth iron pin well driven home into a firm post,—low down it it is intended that pigs shall catch themselves ; out of their reach, if a pull-off by a trapper is contemplated. A lever is placed between the ring and the post, in form of a long stick, is the pigs have to let down the doors : in shape of a shorter board with a wire through it, when the pull-off is to be done by a man.

The next thing is to build two *machans*, at a short distance of 30 to 40 yards from each side of the trap, to enable the trapper always to take up his position down wind. The trap is now complete, and the business of seducing the pigs to enter begins. This may sound doubtful, but nothing is easier in practice, and pigs may be collected in it from miles around.

Trains of coarse grain, more or less continuous, are laid from different parts of the forest, all ending near the trap, where shallow trenches are dug and are constantly refilled with a small quantity of grain of sorts which should be covered by a layer of a few inches of soil, in order to prevent deer from entering together with the pigs. The former would soon make a *tabula rasa* of the food, and the animals would disappear before day-light. In less than a month the pigs become quite accustomed to the trap, and in a very short time to the trapper as well, who ought to be near the trap, or in one of the *machans* for another fortnight or so at the time of feeding.

Then comes the time for action. The trapper is early in his *machan* and pulls off when a sufficient number of pigs have entered the trap. Hereafter the trap can be set for self-action, to get hold of solitary boars and any other pigs that may have been left. The pigs should not be killed in the trap, or near it. The trapping must be done by the man to whom the pigs have grown accustomed, and any bungling in the catching should be avoided, or future takes will be rendered infinitely more difficult.

INDIA AS A WHEAT COMPETITOR.

THE *Pioneer Press*, St. Paul, Minn., publishes a four column letter addressed to it by Mr. J. L. Hauser, of Cawnpore, India, under date of July 17th, 1885. It treats exhaustively on the subject of wheat production in India, the methods employed, cost of production, and of export, etc., etc. As India has become our greatest wheat competitor in the markets of Europe, the subject is one of interest and importance to the American wheat grower. We therefore present, in condensed form, the substance of the most important points presented in the letter. The portion of India best adapted to wheat culture (but not the only wheat producing portion) is what is known as the north-west provinces, comprising an area about twice as large as the state of Illinois. The soil is alluvial in its character, very fine in texture, and composed of some kind of clay with a considerable admixture of sand. In its mechanical conditions it is very favorable to the farmer, whose implements are of the most primitive character. While as Mr. Hauser says, such a soil in Minnesota would be of little value and the soil of Minnesota, if it could be transferred to India would be sold for manure, the peculiarities of climate and meteorological condition are such as to enable it to store up a large amount of nitrogen from the atmosphere, supplying an abundance of plant food, and making it productive. In the preparation of the soil for a crop, the Indian farmer has a plough about as effective as the old-time narrow bull tongue of the south, to judge by the description, though ruder in construction, which simply roots up the surface instead of turning a furrow. It is drawn by a yoke of native bullocks from one-third to half the size and weight of our oxen. But the Indian farmer goes over his ground from ten to twenty times with this simple plough on ground intended for wheat, each working opening up the soil to the action of the sun, air and rain, and enabling it to store up plant food for the coming crop. He also is careful to save and use every particle of manure possible, his poverty preventing the purchase or use of commercial fertilizers. Besides the plough, the only other implement used in preparing the ground for wheat is a log of wood drawn over the field as a clod crusher. The seeding is done by hand at the last ploughing, the sower dibbling the wheat in the furrow behind the plough at the rate of about 150lbs per acre. The wheat is sown in October or November and harvested in March or April. The most of it is irrigated and is weeded by hand. The reaping is done with a curved hand-sickle, similar to that used for the same purpose in early times in this country. A day's work is stated by Mr. Hauser to be one-twelfth of an acre. This, we think, must be altogether too low, for in the days of hand-reaping in this country, a half acre was regarded as a day's work. The grain is threshed by being tread by cattle upon a hard dirt floor, the treading having a double object, that of separating the grain and of breaking up the straw fine to fit it for feeding, every pound being utilized for this purpose. The grain is cleaned by throwing with a wooden scoop in the wind. An average crop is seventeen bushels per acre for irrigated land and ten bushels for dry. The cost of the farmer's out-fit and of raising a acre of wheat is given by Mr. Hauser as follows:

COST OF OUTFIT.

Pair of Bullocks	$ 12·00
Plough	·40
Yoke	·15
Leveller	·30
Weeder	·6
Winnowing scoop	·3
Sickle	·6
Water-lifter	·50
Total	$ 13·50

COST OF RAISING AN ACRE OF WHEAT.

Rent, per acre	$ 3·60
Cartage of manure	1·20
150 pounds seed	1·65
Ploughing twenty times	·75
Sowing by hand	·15
Waterig three times	2·25
Reaping and carrying	·60
Threshing	·35
Winnowing	·8
Total	$ 10·62

If the land is not of best quality or is at a distance from the farmer's village, the rent is less than the above rate—in some cases not more than half. The total area in wheat in the North-west Provinces and Oudh is stated as follows:—Normal area, 4,965,683 acres; area in 1884, 5,186,338 acres and in 1885, 5,298.026 acres, or an increase of seven per cent over the previous year. Taking the whole of India, the total acreage in wheat for the last crop was 26,826,483 acres, producing 259,103,200 bushels, an average of between nine and ten bushels per acre for the entire country. The exports of wheat from India for the last six years are given in tons, which reduced to bushels gives the following figures:—

1879 80	3,659,233	Bushels.
1880 81	12,423,933	„
1881.82	32,106,866	„
1882.83	23,574,000	„
1883-84	34,928,566	„

Of the crop of 1884-85, there had been exported up to date of Mr. Hauser's letter, but about 25,000,000 bushels. But the total export, he says, may reach double this amount or 50,000,000 bushels. Heretofore the chief obstacle to wheat production and export in the interior provinces, has been the cost of inland carriage by bullock carts, the average cost off which was 1-12th of a cent per bushel per mile. The cost of carting wheat from Cawnpore to Calcutta, a distance of 684 miles was 57·6 cents per bushel, now by rail the cost of shipment over the same distance is reduced to 18 29 cent per bushel.

The Government of India is moving vigourously in opening up the country by the building of railways for the purpose of stimulating wheat production, and the effect is already seen in the increased acreage and still larger increased export; other and cheaper foods, such as rice and millet, taking the place in consumption of wheat, formerly consumed in the interior provinces, because the great cost of land carriage did not permit its export. The price of wheat at interior points of production for the second week in May 1885, as given by Mr. Hauser, ranged from 44 to 57 cents per bushel according to variety and distance from point of shipment.

A comparison of the cost of laying down wheat in Liverpool from Delhi, 890 miles from Calcutta, and Chicago 940 miles from New York, is given as follows:

Cost of wheat per bushel in Delhi	62½c.
Railway freight	20¼
Ocean freight	20¾
Total cost per bushel in Liverpool	$ 1.03½
Cost of of wheat per bushel in Chicago	1.02⅜
Railway freight to New York	19¼
Ocean freight	7½
Total cost in Liverpool	$ 1.29⅛

or a difference in favour of the Indian wheat of 16⅝c. per bushel, but it will be noticed that the price of wheat in Chicago, and of both railway and ocean freight are considerably above present rates and prices. At this writing No. 2 spring wheat is quoted at 82 7/8 cents, freight to New York 5 cents per bushel, and ocean freights down almost to ballast figures. Freights from Chicago to Liverpool are openly quoted at 21 cents per 100 lbs, or 12 3/5 cents per bushel on wheat, and contracts are made below these figures. Taking the present price of wheat 82⅞c. and rate of of freight 12 3/5c., wheat can be laid down in Liverpool from Chicago for 95½c. But no one will claim that these figures furnish a remunerative price to the farmer who grows wheat, nor to the transportation lines which carry it to market. Living rates to both require not less than $1.00 per bushel for wheat in Chicago, and 25c. per bushel freight between Chicago and Liverpool.

The wheat of India, while of several varieties, is classed under four general heads, viz., white and red, hard and soft. Irrigation which is common in India, is furnished by canals, tanks (artificial reservoirs), and wells, all of which are numerous. Where wells are used, the water is raised by bullocks working an endless chain with buckets, or in shallow wells, with the Persian wheel, with buckets on its outer circumference. The writer sums up his article as follows:—

In concluding this report, I will state what I think are the advantages and disadvantages of wheat raising in India: First—The wonderfully permanent productiveness of the climate and soil. Second, the use of irrigation, on account of which there can be no failure of the growth of a crop. Third—The facilities for inland transportation and cheap ocean freights. Fourth—The variety of seasons giving the farmer work in the fields every month in the year, thus making the wheat crop almost an extra or surplus one, the other crops supplying the labourers with food. Fifth—The cheapness of labor. All these combined indicate that the wheat-growing power of India will largely increase. The Government is planning in every way to increase the facilities of irrigation, introducing new seed, and improved methods of cultivation, and also urging that freights on wheat by the State and other railways be greatly reduced.

The drawbacks are: First—Heavy storms of wind and rain that cause the grain to lodge just before harvest, when it quickly spoils in the hot sun. Second—Heavy hail storms, and in some localities frost. The hail breaks the stalk or threshes out the grain. Third—Rust, flies, and locusts or grasshoppers. All these, at times, greatly affect the crops, but they are accidents and expected to occur only occasionally.

The facts above presented, from a reliable source, are worthy of the careful consideration of the American wheat grower. The problem to be worked out by the logic of events, is whether he, with his labor saving implements but high cost of labor and of living, can maintain his supremacy in the wheat markets of the world against the Indian farmer with his rude implements but favourable soil and climate, but whose labor is worth but a few cents a day, and who has the Government actively engaged for his help in providing the means by which his crops can be cheaply transported to market.—*Farmers' Review.*

THE CORN CROP OF 1885.

Elsewhere in this issue will be found a special report upon the corn crop from our crop reporters in the states of Ohio, Indiana, Illinois, Iowa, Missouri, Kansas, Nebraska, Minnesota, Wisconsin, and Michigan. A careful compilation of the figures given in each State as percentages of acreage and condition, and a calculation from these of the percentage of yield or total crop as compared with that of 1884, gives the following results, which will be of interest and value to our readers:

Ohio—Acreage per cent, 129 ; condition, 120 ; crop per cent, 154.
Indiana—Acreage, 105 ; condition, 115 ; crop per cent, 120.
Illinois—Acreage, 112 ; condition, 114¾ ; crop per cent, 128½.
Iowa—Acreage, 104 ; condition, 113 ; crop per cent, 117½
Missouri—Acreage, 101 ; condition, 96 ; crop per cent, 97.
Kansas—Acreage, 114½ ; condition, 98 ; crop per cent, 112.
Nebraska—Acreage, 109 ; condition, 103 ; crop per cent, 112¼.
Minnesota—Acreage, 104 ; condition, 86 ; crop per cent, 89½.
Wisconsin—Acreage, 95⅝ ; condition, 85 ; crop per cent, 81½
Michigan—Acreage, 116 ; condition, 107 ; crop per cent, 124.

A comparison of the amount of crop in each of these States, with that of 1884, is shown by the following tabular statements, in which the figures of the department of agriculture were used for last year's crop:

		Crop of 1884. Bushels.	Crop of 1885. Bushels.
Ohio	...	85,393,000	131,505,000
Indiana	...	104,757,000	125,708,000
Illinois	...	244,544,000	294,239,000
Iowa	...	252,600,000	296,805,000
Missouri	...	197,850,000	191,914,500
Kansas	...	168,500,000	188,720,000
Nebraska	...	122,100,000	137,362,000
Minnesota	...	23,630,000	21,148,800
Wisconsin	...	26,200,000	21,209,000
Michigan	...	26,022,000	30,185,000
Total	...	1,251,596,000	1,438,796,300
			1,251,596,000
Excess over last year's crop	...		187,200,300

It will be seen that of the above States all show a considerable gain over last year, except Missouri, Minnesota, and Wisconsin, which fall short of last year's crop, the largest gains being in States where the wheat crops suffered most severely last winter, and where large areas seeded to wheat the previous fall were ploughed up and planted to corn. These ten States last year produced within a fraction of 70 per cent of the entire corn crop of the country, which the final figures of the department of agriculture placed at 1,795,000 000 bushels. Assuming that the country outside of these States will produce as much corn this year (and such reports as have come under our observation lead to the belief that this will be the case), we have then a total crop for this year of 1,982,000,000 bushels, the largest crop ever produced in this country; and all matured without injury from frost except in some localities where the production is so small, that the damage from this source has no appreciable effect upon the entire crop of the country. An increase in the eastern, middle and southern States of 18,000,000 bushels over last year's crop (quite likely to be realised) would bring the crop of this year up to the grand total of 2.000,000,000 bushels.—*Farmers' Review.*

TOBACCO CULTURE ON THE POOSA FARM.

Letter from H. Caine, Esq., Assistant Manager, Poosa Tobacco Farms, Tirhoot, to the Superintendent of Andamans and Nicobar, —dated 6th October 1885.

I have been requested by the Secretary of Revenue and Agricultural Department of India to send you full instructions as to the method employed here for cultivating, preparing soil, sowing, planting, and treatment while growing of tobacco. I shall endeavour to do so in as clear and concise a manner as possible, and hope you will have no difficulty in following out the instructions.

Preparation of Soil.—Tobacco land should be well drained upland which has lain fallow some time, or that has had some light crop in it; this land should be well manured with well-rotted manure.

We plough our lands twice monthly. Just before the time for transplanting the soil is ploughed up and well pulverised by a henger or beam of wood drawn by bullocks over the upturned soil so as to bend it and to break up any lumps of earth.

The soil should be sufficiently dry for this purpose so as not to cake and harden.

Seed-Beds.—These should be made up in a suitable situation, that is, protected from the hot afternoon sun, having some building or grove of trees on the west side. The seed-beds should be raised some six inches off the ground, and have trenches dug all round so as to carry off any superfluous moisture; the beds should be well worked with a kodalie and good rotted manure well worked in. After pulverising the soil and levelling it, pick off any stones or other rubbish, and it will be ready for sowing the seed.

The size of the beds should be about 4 feet by 15 feet; this is more convenient than square beds as it enables the plants to be attended to without risk of destroying them by trampling on them.

Sowing the Seeds.—The seed is sown broad-cast with the hand, mixed with some sand or ashes so as to sow evenly; care should be taken not to sow too thickly. About one chittack of seed ought to be found sufficient for one of these beds which would furnish enough plants for one beegah of land.

After having sown, and if there is a hot sun, it would be advisable to cover the beds with light mats. The seed should germinate in 7 or 10 days at least. American seed does; Sumatra takes much longer.

The plants may require watering, which should be done with a watering-can with a rose, when the plants are well up and large. Only water seed-beds in the evening. As soon as the seedlings have leaves of the size of a penny, they are capable of bearing transplanting. Before taking up the seedling to transplant, water the beds well an hour beforehand; this is done to loosen the earth about the roots so that the plants may be taken up without injury.

To take up the seedlings they should be seized by the underside of the two largest leaves by the finger and thumb, having one leaf on each side, not by the stem, then pull up gently, taking care not to break the leaves. They may then be placed in an open basket. When the basket is full, it should be covered with a cloth if the sun is hot, and the seedlings slightly sprinkled with water and then carried off to transplant.

The seedlings are planted out in rows 3 feet by 2 feet apart, for which purpose a knotted cord is issued—the knots being 3 feet apart. This cord is drawn by two men—one at each end. Across the field or portion of the field at a distance of 2 feet from the outer edge, the cord is drawn out and then trampled upon by coolies. The knots leave an impression in the soil where the seedlings have to be planted. The cord is then raised and put down again at another distance of 2 feet from the first, and so on, till sufficient land has been marked off. This work can be done during the day, and the transplanting in the evening.

Transplanting.—Transplanting should be done in the evening if there is any sun: in cloudy weather, it can be done all the day long.

Rainy weather is most suitable as it dispenses with watering, and the plants settle better. A boy takes a basket of seedlings and walks up the row, dropping a plant here and there, where the marks have been made; he is followed by a man who makes a hole with a *kurpie* into which he places a seedling, and then presses the soil around the roots firmly with his fingers and then goes on with the rest.

As transplanting can hardly be done here without watering, a boy carrying a can without a rose follows the man who is transplanting, and waters each plant he comes across; but, as I mentioned above, if the transplanting could be done in rainy weather, the watering would be unnecessary. When growing the young plants require some attention.

After the plants have been planted about a week or so, weather permitting, it is advisable to loosen and open the soil around them with a *kurpie*, and also to eradicate weeds which may appear.

Later on, a kodalie may be used to work the earth between the rows.

As soon as the plants have made growth and begin to throw out flower or seed heads, which will take place in about eight weeks or so, they should be topped, *viz.*, the flower heads should be broken off before they flower in this way.

The stem on which the head was found should be seized about two to three feet from the ground and snapped clean off by the hand or figures. This topping will cause the plant to throw out heavy leaves. The higher up the stem is broken off so will the leaves of the plant become thinner and smaller. We generally leave about ten or twelve leaves of each plant.

After topping, numerous suckers and offshoots will spring up; these should be promptly broken off as soon as they appear, as they take a lot of nourishment from the plant. The plant ripens in about three months. We cut here in January, and none but ripe plants should be cut.

How to cut ripe plants.—A tobacco plant is known to be ripe if the leaf cracks when taken between finger or thumb and pressed; and also when the leaves present a swollen appearance and have a heavy look. The stem when cut is full of sap, very thin rind on edge, the leaves are curved over, look mottled, the ribs of the plant get brittle and are easily broken off; when fully ripe, the plant is cut at one stroke close to the ground. The best instrument to cut the plant is with a *kurpie*. When cut, the plant is allowed to hang over on its one side and wilt or droop in the sun.

This wilting takes from one to two hours according to the strength of the sun. When sufficiently wilted (which is known when the plants look drooping and the ribs can be bent slightly without breaking), the plants are placed in a cart and taken off to the curing house. Plants should not be cut in rainy or cloudy weather, as it is obvious the sun would not be hot enough to wilt were the weather cloudy, and the rain washes off the gum, and thereby decreases the weight of the plant. Plants should not be cut after the rains unless the gum has returned to the leaves, which is known by their sticky gummy feeling. Trusting the above instructions would prove sufficient, I beg, &c.,

(Signed) J. F. Price,
Acting Secretary to Government.

Holloway's Ointment.—Sores, wounds, ulcerations, and other diseases affecting the skin, are amendable by this cooling and healing unguent. It has called forth the loudest praise from persons who have suffered for years from bad legs, abscesses, and chronic ulcers, after every hope of cure has long passed away. None but those who have experienced the soothing effect of this Ointment can form an idea of the comfort it bestows, by restraining inflammation and allaying pain. Whenever this Ointment has been once used, it has established its own worth, and has again been eagerly sought for, as the easiest and safest remedy for all ulcerous complaints. In neuralgia, rheumatism, and gout, the same application, properly used, gives wonderful relief.

WHAT IS THIS DISEASE THAT IS COMING UPON US?

LIKE a thief at night it steals in upon us unawares. Many persons have pains about the chest and sides, and sometimes in the back. They feel dull and sleepy; the mouth has a bad taste, especially in the morning. A sort of sticky slime collects about the teeth. The appetite is poor. There is a feeling like a heavy load on the stomach; sometimes a faint all-gone sensation at the pit of the stomach which food does not satisfy. The eyes are sunken, the hands and feet become cold and feel clammy. After a while a cough sets in at first dry, but after a few months it is attended with a greenish coloured expectoration. The afflicted one feels tired all the while, and sleep does not seem to afford any rest. After a time he becomes nervous, irritable, and gloomy and has evil forebodings. There is a giddiness, a sort of whirling sensation in the head when rising up suddenly. The bowels become costive; the skin is dry and hot at times; the blood becomes thick and stagnant: the whites of the eyes become tinged with yellow, the urine is scanty and high-coloured, depositing a sediment after standing. There is frequently a spitting up of the food, sometimes with a sour taste, and sometimes with a sweetish taste; this is frequently attended with palpitation of the heart; the vision becomes impaired with spots before the eyes; there is a feeling of great prostration and weakness. All of these symptoms are in turn present. It is thought that nearly one-third of our population has this disease in some of its varied forms. It has been found that medical men have mistaken the nature of this disease. Some have treated it for a liver complaint, others for kidney disease, etc. etc., but none of the various kinds of treatment have been attended with success, because the remedy should be such as to act harmoniously upon each one of the organs, and upon the stomach as well: for in Dyspepsia (for this is really what the disease is) all these organs partake of this disease, and require a remedy that will act upon all at the same time. Seigel's Curative Syrup acts like a charm in this class of complaints, giving almost immediate relief. The following letters from chemists of standing in the community where they live show in what estimation the article is held:—

John Archer, Harthill, near Sheffield:—I can confidently recommend it to all who may be suffering from liver or stomach complaints, having the testimony of my customers, who have derived great benefit from the Syrup and Pills. The sale is increasing wonderfully.

Geo. A. Webb, 141, York-street, Belfast:—I have sold a large quantity, and the parties have testified to its being what you represent it.

J. S. Metcalfe, 55, Highgate, Kendal:—I have always great pleasure in recommending the Curative Syrup, for I have never known a case in which it has not relieved or cured, and I have sold many grosses.

Robt. G. Gould, 17, High-street, Andover:—I have always taken a great interest in your medicines, and I have recommended them, as I have found numerous cases of cure from their use.

Thomas Chapman, West Auckland:—I find that the trade readily increases. I sell more of your medicines than any other kind.

N. Darroll, Clun, Salop:—All who buy it are pleased, and recommend it.

Jos. Balkwill, A.P.S., Kingsbridge:—The public seem to appreciate their great value.

A. Armstread, Market-street, Dalton-in-Furness:—It is needless for me to say that your valuable medicines have great sale in this district—greater than any other I know of, giving great satisfaction.

Robt. Laine, Melksham:—I can well recommend the Curative Syrup from having proved its efficacy for indigestion myself.

Friockheim, Arbroath, Forfarshire, Sept. 23, 1882.

Dear Sir,—Last year I sent you a letter recommending Mother Seigel's Syrup. I have very much pleasure in still bearing testimony to the very satisfactory results of the famed Syrup and Pills. Most patent medicines die out with me, but Mother Seigel has had a steady sale ever since I commenced, and is still in a great demand as when I first began to sell the medicine. The cures which have come under my notice are chiefly those of liver complaint and general debility.

A certain minister in my neighbourhood says it is the only thing which has benefited him, and restored him to his normal condition of health after being unable to preach for a considerable length of time. I could mention also a great many other cases, but space would not allow. A near friend of mine, who is very much addicted to costiveness, or constipation, finds that Mother Seigel's Pills are the only pills which suit his complaint. All other pills cause a reaction which is very annoying. Mother Seigel's Pills do not leave a bad after-effect. I have much pleasure in commending again to suffering humanity Mother Seigel's medicines, which are no sham. If this letter is of any service, you can publish it.

Yours very truly,

(Signed) WILLIAM S. GLASS, Chemist.

A. J. WHITE, Esq.

15th August, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's syrup which he got from me has saved his life.

Yours truly,

Mr. WHITE. (Signed) N. WEBB,
(B) Chemist, Calne.

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Health, Crop and Weather Report.

[FOR THE WEEK ENDING 25TH NOVEMBER 1885.]

Madras.—General prospects fair ; continue favourable in Bellary and Anantapore.

Bombay.—River still low in Sind. Reaping of *kharif* and sowing of *rabi* crops completed in some districts ; in progress in others. More rain wanted for *rabi* crops in parts of Poona, Ahmednugger, and Khandesh. Standing crops damaged by insects in two talukas of Panch Mehals. Cholera in parts of eight, fever and cattle-disease in parts of 13, and small-pox in parts of five districts.

Bengal.—No rain fell in any of the reporting districts except Chittagong, Dacca, and Khoolna. In Chittagong rain heavy and has done some harm to the standing crops. *Amun* harvest is progressing with prospect of a good outturn, except in the flooded tracts, and in parts of Behar which have suffered for want of October rain ; *rabi* crops generally look well, but want of rain somewhat interferes with *rabi* and poppy sowings. Price of rice has generally fallen. General health continues fair.

N.-W. P. and Oudh.—Weather seasonable. *Rabi* operations nearly completed everywhere, and crops so far progressing favourably, but want of moisture has affected the area sown. Prices steady. Health generally good ; cholera and fever abating ; condition of cattle fair.

Punjab.—No rain ; it is much needed. Slight fever in the Delhi and Peshawur districts, in the Kahuta and Attock tehsils of the Rawul Pindee district, and in the Dera Ismail Khan city ; cholera prevalent in a few villages of the Dehra Ismail Khan district ; health elsewhere generally good ; rinderpest has appeared among cattle in the Bhera tehsil of the Shahpore district. *Rabi* operations in progress. Prices rising in the Hissar, Umritsur, Lahore and Rawul Pindee districts, falling in the Mooltan district, and stationary elsewhere.

Central Provinces.—*Rabi* sowings have been nearly completed throughout the provinces, and as a rule are germinating well, although in some places the October rain was insufficient ; the cotton crop is coming into market and is fully up to anticipation.

British Burmah.—Slight cholera in seven districts, elsewhere public health good ; slight cattle-disease in four districts, elsewhere health of cattle good. Crop prospects good in all districts, except in parts of Hanthawaddy, Prome, and Moulmein districts, where more rain is required. Reaping of crops commenced in Hanthawaddy, Henzada, and Moulmein districts.

Assam.—Weather seasonable ; rainy in Cachar : public health fair. *Kalajur* seems still to be lingering here and there in the Luki tehsil Prospects of all crops good Reaping of *sali* commenced. Common rice 16 seers 15 chittacks per rupee. *Matikalai* and mustard doing well ; *sali-dhan* being reaped.

Mysore and Coorg.—Crops in good condition, except at Tumkur where the late sown *ragi* needs rain. Cattle-disease in parts of Kolar, Shimoga, and Kadur. Prospects of season good. Public health good, except in the Tumkur and Shimoga districts, where fever is prevalent. Harvesting of *ragi* in progress, water and pasturage abundant No material change in prices.

Berar and Hyderabad.—Weather clear and cool. *Kharif* being out ; prospects of *rabi* good. Wheat 22 and *jowari* 26 seers per rupee in Amraoti. Cotton picking continues ; *abi* crops are ripe and ready for harvesting. Fever and ague prevail in some talukas, and cholera in Patlur taluka. Prices in Hyderabad—wheat 14, coarse rice 12½, white *juar* 20, *yellow juar* 27, and *tur* 15½ seers per current sicca rupee.

Central India States.—Weather seasonable. Prices stationary Health and prospects good. Sowings of *rabi* approaching completion.

Rajpootana.—Weather cool and clear. Fever decreasing in Abu. Tanks and wells fair in all places except in Meywar, Kerowli and Dholepore. *Rabi* sowings progressing ; fever to some extent still prevails in Marwar. Crops being gathered. *Jowar* being harvested in Harowti, where fever prevalent. Prices—wheat 22, barley 32, gram 32, *bajra* 23, and *jowar* 30 seers per rupee. Stationary generally. Health good. Prospects fair.

Letters to the Editor.

TEA-BLIGHT.

TO THE EDITOR.

SIR,—In your issue of the 7th ultimo you stated that "the latest news from the tea districts is that blight is very prevalent in most gardens in the Terai." I therefore read carefully the succeeding issues of your much esteemed paper, for some remedy for Tea-Blight, which *A Quondam Tea-Planter* might have suggested. But as up to date he has not come forward with any suggestions, I presume to address you with the following method of removing blight from tea-plants which Mr. Kurz, some time Curator of the herbarium in the Royal Botanical Gardens, Calcutta, approved :—Plant *bhang* (*cannabis sativa*) between the rows of tea plants. This will act as a preventive to the attacks of *acari* and other wingless insects.

HEM CHUNDRA DUTTA.

Calcutta, December 1, 1885.

P.S.—I will reply to *Inquirer* shortly.

Editorial Notes.

WE learn that a Royal Commission, consisting of Members of the Council of Agricultural Education, has been appointed at Melbourne to make enquiries as to the products, other than wheat, to the growth of which the climate and soil of that colony are adapted. Several specialists have been requested to send in papers on the subject.

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IN May or June last Sir J. B. Lawes read before the Royal Agricultural Society of England, a paper on "sugar as food for stock," in which his experience was unfavourable from an economical point of view to the use of sugar as a food for stock. A correspondent, signing himself F. Calino, has addressed a letter to the *Queenslander* (which will be found elsewhere), from which it would appear that it has been used most successfully in Queensland.

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IT is stated that the plant called *Ferula sumbul*, which grows in Russian Turkistan, has recently attracted the attention of medical science as a prophylactic against cholera on account of its exciting and antispasmodic properties. The juice of this plant is exceedingly bitter and has a musk flavour. The plant could not for a long time be conveyed to Europe because the natives of Turkistan were unwilling to show where it grew. Thanks, however, to the exertions of the famous *savant*, Fedchenko (now deceased), specimens were procured and have been acclimatized in the Moscow Botanical Garden.

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AFTER reading all that has been published in the Bombay papers regarding oysters, it is a positive relief to turn to Mr. G. A. Sala's account of the Auckland natives. He says :

> From personal experience I can vouch for the respectable dimensions, firm texture, and delicious taste of the Auckland

oysters, of which, for six pence, you may obtain sufficient to elevate to the seventh heaven of sybaritism an amateur of oysters, who, driven to despair at having to pay three shillings and sixpence a dozen for natives, had emigrated to the antipodes, not to invest in sheep or cattle runs, to dabble in grain, to speculate in land, or to gain experience—and lose money—in gold-mining, but to seek for molluscs plentiful, excellent, and cheap. The cray fish likewise swarm, and are as fine in flavour as they are at Trieste, which is saying much.

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The total value of the imports into British India during the six months from 1st April to 30th September 1885 amounted to Rs. 24,16,95,991, which shows a decrease of Rs. 1,21,12,702, as compared with the imports for the same period last year. The total value of exports during the same period of 1885 amounted to Rs. 37,41,00,261, as compared with Rs. 39,51,36,221, during the same period last year, showing a decrease of Rs. 2,10,35,957. These figures indicated plainly the great depression of trade. Taking the decrease in the value of exports and imports together, we have a falling off amounting to Rs. 3,31,58,659 during six months of the present year.

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A home contemporary notices that the falling off in the consumption of coffee in England is attracting some attention. In 1860 the consumption, with a population of 29,000,000, was 35,671,381 lbs., or 1 23 lbs. per head. In 1884, with a population of 36,000,000, the consumption was only 33,016,256 lbs., or 0·91 lb per head, or a diminution of 25 per cent. On the other hand, the consumption of cocoa during the same period has increased from 0·12 lb. per head to 0·38 lb. per head. The increase in the consumption of tea shows an important increase. In 1860, 2·66 lbs. per head were consumed ; in 1884 it was 4 82 lbs. per head. This decrease in the consumption of coffee is the more remarkable, since during the past few years a very large number of coffee houses have been established throughout Great Britain and Ireland. In some papers we see that the figures given are 69,000 tons in 1861, against 11,000 in 1884, a diminution of 28,000 tons since 1861, which is evidently an

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According to recent reports, the position of the jute industry in Germany is not very encouraging. The price of jute goods, we learn from *Kuhlow's*, has seriously fallen. There has been a fall in the price of raw materials, but it is not at all proportional, while wages have suffered no reduction. One cause of the present unsatisfactory state of things is the lifelessness which characterises all markets, and the general falling off in consumption. The business report of the Jute Spinnerei und Weberei at Harburg strikingly reflects the general condition of this trade. These works had in operation at the close of the business year 8,700 spindles and 224 looms, and manufactured during the year 3,610,478 toll-lb. of yarn, 3,746,646 metres of material, 1,812,274 sacks.

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It is stated that at an experiment recently tried at the Inventions Exhibition Aquarium, by Mr. W. August Carter, with a view to discover how far fish are prone to sleep, it was found that amongst freshwater fishes the roach, dace, gudgeon, carp, tench, minnow, and catfish sleep periodically in common with terrestrial animals. The same instincts were found to actuate marine fish, of which the following were observed to be equally influenced by somnolence—*viz.*, the wrasse, conger eel, dory, dogfish, wrasse bass, and all species of flat fish. Mr. Carter states that, so far as he can discover, the goldfish, pike, and angler fish never sleep, but rest periodically. Desire for sleep amongst fish varies according to meteorological conditions. Fish do not necessarily select night time for repose.

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From the recently-published agricultural statistics, it appears that New Zealand made great strides in wool exportation during 1884, when the quantity shipped amounted to 81,139,028 lbs., as compared with 68,149,430 lbs. in the previous year the largest quantity exported up to that time. Such a sudden increase would lead to the suspicion that New Zealand shipowners had been killing the goose that lays the golden eggs ; but, in spite of the great increase in the exports of mutton, which reached 12,703 tons in 1884, the stock of sheep also increased The statistics show a great falling off in wheat exports, *viz.*, from 4,897,540 bushels in 1883, to 2,706,775 bushels in 1884. On the other hand, the export of oats increased from 1,619,764 bushels to 2,474,631 bushels, the latter quantity being the largest yet exported in any year.

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The imports of foreign live-stock and fresh meat from the United States and Canada into Great Britain has attracted considerable attention. The following statistics of the arrivals at Liverpool from American and Canadian ports during three months, from July to September last, will be read with interest :—July 9,989 cattle, 2,533 sheep, 33,289 quarters of beef and 3,116 carcases of mutton ; August, 10,946 cattle, 7,051 sheep, 32,112 quarters of beef, and 759 carcases of mutton ; September, 7,830 cattle, 2,918 sheep, 27,902 quarters of beef, and 1,130 carcases of mutton—making the total imports for the quarter 28,765 cattle, 12,502 sheep, 93,300 quarters of beef, and 5,305 carcases of mutton, whilst the preceding three months' shipments amounted to 26,100 cattle, 1,015 sheep, 118,285 quarters of beef, and 16,120 carcases of mutton, thus showing an increase in the importation of cattle, sheep, and mutton, but a decrease in the consignments of fresh beef.

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One of our exchanges notices that M. Houles, the French discoverer of the method of open-air or stack silo, reports the continued success of his method. The secret of the success of this method lies in such uniform and continued pressure as will secure the expulsion of the air and thus prevent decomposition. The material is carted to the place of stacking as fast as cut, without waiting for any drying, and is built up slowly and uniformly, allowing fermentation to start, making the forage more tender, care being taken to prevent the stock from leaning as it settles. When the stack is finished, the top is covered with inch boards projecting a few inches over the sides, and then weighted at the rate of about 2,000 lbs. to the square yard, with any convenient material, stones, earth, or firewood. The only drawback to the plan is said to be the difficulty in keeping the sides perpendicular.

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It is stated by a home contemporary that a staff of State agriculturists has been instituted in Belgium by royal decree, chiefly with the object of popularising the theory and practice of scientific agriculture. The members of this body are to put themselves in direct communication with the cultivators of the soil, giving advice gratuitously to all who ask for it. Besides fulfilling the functions of travelling agricultural advisers, they are to arrange annually, in at least five districts of each province, a complete course of instruction on one or other branch of agricultural science or practice, suitable to the locality in each case. Experimental fields for the practical instruction of cultivators have been provided in each region, to be placed under the direction of the State agriculturist. The Inspector of Agriculture is to be the chief of the new body of officials, and over him will be the Minister of Agriculture, Industry, and Public Works, who will make all necessary arrangements for carrying into effect the royal decree. Agricultural councils and societies are invited to assist in the establishment and maintenance of the experimental fields. At present, eleven State agriculturists have been appointed.

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A Novelty in dairy appliances was exhibited at the Dairy show recently held in London in the Delaiteuse, a centrifugal machine for separating water or buttermilk from butter, instead of squeezing with the hand or using the butter-worker. The machine is made on the principle of the cream separator, which it resembles in appearance. The butter, in a granular state, as it comes from the churn, is put into a canvas bag, which, in its turn, is placed in a perforated cylinder in the machine. The cylinder is made to revolve very rapidly, when, by centrifugal force, it throws all the water to the circumference, where it drains away, leaving the butter dry; and fit to be made up at once. In small dairies this invention is scarcely likely to oust the much cheaper butter-worker, but no doubt it will be used in butter factories and other large establishments. It was exhibited by the Dairy Supply Company, of Museum-street, W. C.

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Improvement in agricultural methods, says the *Universal Engineer*, appears to be making steady progress in the German Empire. The cultivation of beetroot has led to the practice of deeper ploughing and better working of the soil in the districts where it is grown, greatly to the advantage of crops subsequently planted on the same land. But in recent years there has also been a widely-extended increase in the use of agricultural machinery. The results of the census taken in June, 1882, show that there were then in use throughout Germany 836 steam ploughs, 19,634 reaping and mowing machines, 374,057 steam and other threshing-machines, and 63,842 sowing-machines. These large numbers have since been greatly augmented, and are being added to every year.

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A German paper says that under the name "Salzungen cigars," cigars have recently come into the market which are made in Thuringia, especially at Salzungen. The firm of Eichhorn and Forster, of Salzungen, has for two years endeavoured to introduce tobacco cultivation in the neighbourhood of that town, and not without success. The leaves of the better West Indian and North American tobacco plants, the seed of which is sown in German earth, are of a quality which far surpasses that of the ordinary smoking and cut tobacco. Of course, these fine tobaccos require considerably more care than the ordinary kinds, and for that reason more has to be paid for them. The importance to the cigar industry of the production of better sorts will be acknowledged when it is remembered that manufacturers can buy direct. The modes both of cultivation and harvesting are very different to the usual modes. The leaves are generally cut from the plant, strung on a cord, and hung to dry. Here, however, the entire plant is gathered and dried, the result being a superior aroma and quality. The tax law forbids harvesting after this American system, but by the interposition of the Meiningen Government and the concessions of the tax authorities, that system is carried on at Salzungen. The quality of the Salzungen cigars is spoken of in the highest terms.

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The National Pear Conference, which was inaugurated under the auspices of the Royal Horticultural Society, on the lines of the Apple Conference of 1883, was opened at Cheswick on Oct. 21, when over 6,000 plates of fruit were exhibited. These included some 500 different varities—specimens of 220 of which were drawn from the gardens themselves—and represented contingents from 40 different counties; Ireland, Scotland, France, and the Channel Islands contributing their share. The pear crop was generally abundant and good, and thus a splendid opportunity was offered by the show for examining the numerous varieties. It may be mentioned that there was no competition, and that no prizes were awarded at this show, the objects being the dissemination of useful knowledge, on the varieties most suitable for cultivation, a comparison of relative merits, and the correction of the nomenclature. Every exhibitor was invited to accompany his contributions with available information respecting soil, stocks, exposure, &c. In this show the fruit was grouped according to the county in which it was grown. The exhibition presented an endless variety as regarded shape, size, and colour. Some specimens gloried in the most brilliant orange and red tints, while others showed an exterior merely of a dirty-brown colour; some again—notably those from Jersey—were a pound or two in weight, while others were scarcely larger than a gooseberry; not a few charged the surrounding atmosphere with the most appetising of aromas.

A new method of manufacturing cheese has been invented in Switzerland by M. Reber, which consists in heating the milk to a temperature of 86 degs. to 88 degs. Fahr., for some twenty-five to thirty minutes, when the colouring material and rennet are added. When the curd is fit to break, it is broken and placed in linen cloths, and then in the moulds, which vary in size according to the quantity of curd that is dealt with. It is next pressed, but as it is yet somewhat soft, it is generally found best to place it in a bath for five or six minutes, the temperance of which is between 127 degs. and 131 degs. Fahr. The crust of the cheese becomes hardened, although the character of the interior changes very little, and in this way the preservation of the cheese is much more easy. It is next pressed for twenty hours, then steeped in brine for from three to six days. The brine is made in the proportion of nine pounds of water to two and-a quarter pounds of salt; but care is necessary in the salting operation to see that the cheese has more or less salt, according to the exigencies of the case. The actual profit is said to be about 10 or 12 per cent, and considering that, a quantity of whey is left in the cheese in the process of manufacture, M. Reber does not think it is at all a bad return. The average price of the cheese, which becomes more and more pungent with age, is a trifle over 6d. per pound,

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Our German contemporary states that the Magdeburg Association for the protection of the sugar industry has issued an interesting circular, in which it is stated that returns representing 289 German sugar manufacturers give the following data. The average yield of beets is estimated at 142·82 centners per acre against 157·1 centners in the last campagne. The 289 manufactories will use daily in this campagne 371,050 centners of beets against 545,381 centners estimated, or a decrease of 31·96 per cent, as compared with last year. As to quality 92 works report that is better, 116 that it is worse, and 74 that it is equal to last year's. A correspondent at Magdeburg writes that in many places a greater decline in polarisation than was expected is announced, so that the beet harvest will be below the original estimates. At present this circumstance has little effect on the sugar market, though it is probable that any further decline of sugar prices will be arrested.—It may be added that another estimate of the beet yield, based upon returns from 307 works, gives it at 142¾ centners per acre against 156¼ centners, and the total quantity of beets to be manufactured at 367,387 centners daily against 511,554 centners. The quality has, however, so much declined that the falling off this year will be about 32 per cent.

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The last *Assam Gazette* notifies that an Agricultural Exhibition will be held at Habigunge on the 1st, 2nd, and 3rd January 1886. There will be four sections of exhibits. The first section will include live stock, such as bulls, cows, bullocks, and buffaloes, ponies, sheep, goats, and poultry. The second will include agricultural instruments, such as ploughs, sugarcane-mills, oil-mills, cotton-cleaning machines, and other implements of agricultural use. The third section will include agricultural produce, grain, pulse, and tubers, fibres, cotton, and wool, oil-seed, sugarcane, and molasses, dyes, tobacco, &c. The fourth section will include all kinds of arts and manufactures. The show is intended primarily for the sub-division of Habigunge, but exhibitors from other places can be awarded prizes. No charge will be made for the admission of live stock and articles intended for exhibition. Prizes to the value of Rs. 500 will be awarded at the conclusion of the show. All produce, implements, and live stock intended for show should be sent to the secretary before one clear day of the show. All live stock and articles intended for sale must have their prices attached to them. Every facility will be given to effect sales, and no percentage will exacted on such sale.

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Mr. Verbeck, who was deputed by the Government of Netherlands India to report on the origin and character of the volcanic outbreak in the Sunda Straits in August, 1873, calculates, in his report just published, that the amount of ejected matter from Krakatoa must have been at least 18 cubic kilometres. This would be enough to make a respectable range of hills about a thousand feet higher than the surrounding plain, and stretching from Lahore to Delhi. The velocity of ejection was considerably greater than that of the heaviest rifled ordnance and the ejected material must have reached a height of thirty miles or six times the height of Mount Everest, the highest mountain in the world. The noise of the explosions was heard over one-fourteenth of the earth's surface; and a great atmospheric wave starting from Krakatoa, as its centre, spread itself round the world, describing the whole circumference in some thirty-six hours. The mass of floating pumice found after the outburst on the surface of the sea, has been drifting in the direction of America, and the learned author times it to arrive off Panama early in 1886.

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In mulching newly-planted trees, or those set for some years, says the *American Agriculturist*, we not only prevent suffering for want of moisture during the dry weather in summer, but enable them to obtain those elements which they require for nourishment and growth. In selecting a material for mulch, one of a fibrous nature, or at least one that will not become compact and hard, after being beaten by some heavy rains, is always preferable to any other. The more plant food the material contains the better, and for this reason coarse litter from the stable or farmyard has no superior for this purpose. Meadow hay may be ranked next in value, then straw, corn stalks, bog hay from low lands, and thence downward in the scale to pine or basswood shavings and sawdust. Almost any material that will shade the surface of the soil and admit air and water will prove of great benefit to newly-planted trees, and frequently restore to health the old and feeble or those stunted in growth from lack of moisture at the roots, and those fertilizing elements that can only be absorbed and utilized when presented in a liquid or gaseous form. Even small stones may answer.

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The following is the report on the state of the season and prospects of the crops for the week ending 25th November 1885:—Good rain continues to be reported from parts of the Madras presidency. The prospects of the crops are generally fair. In Mysore the crops are in good condition, though more rain is wanted for the late *ragi* in Tumkur. The *ragi* harvest is in progress, and pasturage is abundant. In Coorg the season promises well. No rain has fallen in the Bombay presidency during the week under report. The *kharif* harvest and *rabi* sowings have been completed in some districts. In parts of Poona, Ahmednugger and Khandesh the *rabi* crops need more rain. In the Berars and Hyderabad the *kharif* is being cut and the *rabi* promises well. In the Central India and Rajputana States the crops are in good condition, and the *kharif* harvest and *rabi* sowings are in general progress. In the Central Provinces *rabi* sowings have been nearly completed and promises well, though the October rains were deficient in places. A good cotton crop is expected. Rain is much needed in some places in the Punjab. The *kharif* harvest is nearly complete and *rabi* operations continue. Seasonable weather prevails in the North-Western Provinces and Oudh, and prospects are favourable. In Bengal the rainfall of the past week has been confined to the districts of Dacca, Khoolna and Chittagong, in the last-named of which it has done some damage to the crops. The *aman* harvest promises a good outturn, except in the flooded districts, and the *rabi* crops are coming up well. In Assam the reaping of the *sali* crop has commenced and prospects are favourable. In British Burmah the rice crop is being reaped. The public health continues generally fair. Prices are generally stationary, except in the Punjab where they are fluctuating, and in Coorg and Bengal where they are falling.

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Mr. Joseph Steavenson, Honorary Secretary of the Agri-Horticultural Society of Madras, has addressed the following letter to *Forestry*, regarding the history of the Mahogany tree:—

By this mail I am sending you a copy of the *Proceedings of the Agri-Horticultural Society of Madras*, containing a letter of mine giving the history of the introduction of the mahogany tree to the East Indies, which would, I think, be interesting to many of your readers. The grand growth of the tree here has lately attracted attention, and Government is at present, with the assistance of the Kew authorities and the Government of Jamaica, endeavouring to increase it largely.

There is a another subject in which I am deeply interested, in which you can probably assist me. There are to the north and south of Madras thousands of acres of sand-dunes which, within the last five and twenty years, I and others have covered with thriving forests of *Casuarina muricata*, Roxb. The tree in favourable parts of the sands grows to a noble size, and that very rapidly. I have many 40 to 60 inches in girth at 5 feet from the ground, and tapering up probably 90 or 100 feet as straight as and very like a larch planted in 1871. A few trees cut for poles, shed building, rails and such-like uses, but hundred of acres go down in a very immature state every year for firewood. The wood is very hard, of great density and specific gravity, and bears a great strain, but is so liable to warp, perhaps from ignorance of the proper method of seasoning it, that it is very little used for other purposes. I have seen the wood take a very high polish, and some good tables and other articles of furniture made of it. It appears to me absolutely sinful to waste the well grown trees for firewood, and it has occurred to me that there might be a market for them at home for paving blocks, even if the wood will not season to prevent warping. The logs could, I believe, be profitable to put on board-ship at from £1 to £2 per ton.

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The October report of the Statistician to the Department of Agriculture, Washington, states that the last winter was the most destructive for wheat since that of 1866. That of 1881 was not so bad, as the portion utterly destroyed or so nearly a total destruction that other crops were substituted for it, was much less then. The worst part of the breadth was so generally given up that the remainder will average quite as well as the crop of 1881, which made a yield of 10·2 bushels, the smallest ever reported. The present average is about 10·5. It would have been 9 on the area planted, and not much over 9·5 if as large a portion of the area sown had been counted as in 1881. The area harvested is not precisely determined, but will probably not much exceed 34,000,000 acres. The indications are essentially the same as those of last month, pointing to about three hundred and fifty millions, possibly a trifle more, the exact figures of the final record of estimates depending on the precise ascertainment of the area harvested, a point of greater difficulty to determine the present year than in almost any previous year. The area, product, and farm value of the crop, will be placed on record in the December issue, after the December return of prices. The final record, after the verification of areas and tests of results harmonized, will not probably differ materially from former indications, which have a range of only 12,000,000 bushels in the fluctuations of condition from June to October, or a third of 1 per cent. The winter wheat decline in April and May, from a loss of re-sown area, unfavorable weather, and a clearer realization of the extent of the real injury, was 56,000,000 bushels. The results of June and July were favorable, and in several States the outcome was considerably larger than was expected on the 1st of June, notably in Michigan and Texas, the outcome being at the rate of 20 bushels per acre in the former State, a larger yield than has been previously reported. The reports from the Middle States, of the results of thrashing, show in many cases a better product than the appearance of the grain indicated. There are fields reported in Maryland in which the yield was 45 to 50 bushels per acre, furnishing new evidence of the profit and safety of good cultivation and fertility well sustained in an unfavorable season.

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The same report publishes the following regarding the cotton crop:—

The high condition of cotton in June and July was not maintained in August and September. Severe storms and excessive rains have prevailed; rust has destroyed the foliage, and worms have injured the fruit worse than for several years. Another fall in the average of condition has occurred, from 87 on the 1st of September to 78. The average in October of the census was 81, and the ultimate yield four tenths of a bale. This year the greatest decline is in the region of highest rate of yield, reducing the relative production. The Department estimate of increase of area since 1879 is 26 per cent.

The returns relate both to condition and to prospective yield per acre in hundredths of a bale. The figures must not be considered final, as the date of killing frost and the autumn weather may easily cause a variation of a quarter of a million bales. Condition by States is as follows: Virginia, 78; North Carolina, 77; South Carolina, 79; Georgia, 87; Florida, 58; Alabama, 81; Mississippi, 80; Louisiana, 77; Texas, 78; Arkansas, 70; Tennessee, 74.

The expected yields, with average future conditions, are: Virginia, 32 hundredths of a bale; North Carolina, 38; South Carolina, 35; Georgia, 35; Florida, 23; Alabama, 30; Mississippi, 41; Louisiana, 43; Texas, 38; Arkansas, 42; Tennessee, 35. Average, 36¼ hundredths of a bale. It indicates a million bales more than the present crop, subject to future meteorological conditions.

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WRITING on the subject of bone dust as a fertilizer for wheat, the *Farmers' Review* says that in order to test the value of commercial fertilizers for crops in the State of Indiana, the agricultural department of Purdue University has for some years been testing them on the experiment farm. But in order to test their value under different soil conditions, it has commenced giving out stated quantities to farmers to be used in different localities under similar conditions. Last year it gave out to six farmers, residing in as many different counties, 200 pounds each of bone dust, to be used on plats of wheat, at the rate of 100 pounds per half acre, the fertilized half acre to alternate with unfertilized plats of the same size, to be grown under precisely the same conditions, excepting the use of bone dust. The results, as shown by the reports of the farmers, are published in the *Indiana Farmer*. The conclusions drawn from the result of these experiments, as well as those on the college farm, so far as it is proper to draw conclusions from the results of the season's experiments, are given by Professor Latta as follows: "1. A suitable commercial fertilizer may be, in some cases, a partial protection against severe winters. 2. The effect of a fertilizer will vary with the kind of soil and the degree of natural fertility. 3. On moderately rich soils commercial fertilizers are of doubtful utility, from a financial standpoint. 4. Farmers should carefully test various fertilizers in order to determine what will give best returns. While it may be true that there are some commercial fertilizers which may be used with profit by the western farmer, it yet remains true that in the clover plant he has an agency for maintaining the fertility of the farm of more value than all the commercial fertilizers in the market combined.

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AN efficient remedy for mildew on plants is worth having. A correspondent, writing to the *Gardeners' Chronicle*, says:—

> In your article on the Chrysanthemum, you say, "the first traces of mildew should be destroyed with flowers of sulphur dusted over it." Why flowers of sulphur, when there is a remedy so far superior available? Sulphur in that form is unsightly, inconvenient to apply, and, being insoluble, very imperfect in its effects. Some time ago I directed attention in your columns to a very soluble sulphur compound, sulphide of potassium, which, when applied in solution, say half an ounce to the gallon, leaves no unsightly effects, is easily distributed over the plant by the syringe, spray disperser, or by immersion, and which, so far from being in any way injurious, actually benefits the plant, even when applied to its roots, killing fungus in the soil and driving out worms. The solution kills all fungoid growth with which it comes in contact, but it is not sufficient in some cases to syringe only, as I have met with some forms of mildew which throw off the solution as a duck's back repels water; in such cases, contact must be ensured by the sponge or other means. An efficient, cheap, and easily applied remedy cannot be too widely made known, if consideration be given to the infinite mischief done to the vine, cucumber, hop, pea, rose, hollyhock, chrysanthemum, &c., (the list is too long to be enumerated in full detail), by various forms of fungoid disease. I intend another year to try its effect on the pear, soon after the fruit is set, as some of the best varieties in my garden are rendered worthless by forms of fungus peculiar to that fruit; for this and other purposes, it is desirable that a spray disperser on a large scale should be contrived. No one who has ever tried sulphide of potassium would ever again have recourse to flowers of sulphur. Mr. Coleman, of Eastnor Castle Gardens, writes:—"I have given the small bottle of sulphide of potassium a fair trial, and the excellent effect it has produced is more than satisfactory—it is marvellous;" a gardener of his eminence would not have committed himself to terms so strong unless he had thoroughly proved its efficiency. Sulphide of potassium is equally fatal to low forms of animal and vegetable life in animals, as in plants; consequently is a specific for the diseases caused by them, I can testify, after an extended experience of more than thirty years, in the words of Mr. Coleman, to the excellent, and, indeed, marvellous cures effected by it, often when skilled physicians had failed in various forms of skin diseases, poisoned wounds, whitlows, &c., in mange in various animals, grease in horses, gapes in pigeons, poultry, &c. It is very rarely used by the medical profession; they do not try it because it is not considered an elegant preparation, and as it has an odour often associated with sewers, may be supposed in these days of sanitary science to be injurious to health.

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BARON FERD. VON MUELLER, K.C.M.G., of Victoria, gives the following instructions for making potash:—"The wood, bark, branches, and foliage are burnt in pits about 3 feet or 4 feet in the ground; the incineration is continued until the pit is almost filled with ashes. Young branches and leaves are usually much richer in potash than the stem wood, hence they should not be rejected. The ashes thus obtained are placed in tubs or casks on straw over a false bottom. Cold water, in moderate quantities, is poured over the ashes, and the first strong potash liquid removed for evaporation in flat iron vessels, while the weaker fluid is used for the lixiviation of fresh ashes. While the evaporation proceeds, fresh portions of strong liquid are added until the concentrated boiling fluid assumes a rather thick consistence. At last, with mild fire and final constant stirring, the whole is evaporated to dryness. This dried mass represents crude potash, more or less impure, according to the nature of the wood employed. A final heating in rough furnaces is needed to expel sulphur combinations, water, and empyreumatic substances; also to decompose colouring principles. Thus pearlash is obtained. Pure carbonate of potash in crude potash varies from 10 to 80 per cent. Experiments, so far as they were instituted in the laboratory, have given the following approximate result with respect to the contents of potash in some of our most common trees:—The wood of the casuarinas, or she oaks, as well as that of the black or silver wattle, are somewhat richer than the wood of the British oak, but far richer than the ordinary pine woods. The wood of the Victorian blue gum and the so-called swamp tea tree (*Melaleuca ericifolia*) yield about as much potash as European beech. The foliage of the blue gum proved particularly rich in this alkali, and as it is heavy and easily collected at the sawmills, it might be turned there to auxiliary profitable account, and, indeed, in many other spots of the ranges. In the Queensland coast country the mangrove could be made to yield potash in immense quantities, as it is richer in this alkali than almost any other native tree or shrub, and even if the mangrove were not used for the manufacture of potash, the ash being rich in this valuable fertilizer, could be easily and economically applied for manurial purposes. Of course, British woodmen are aware that it is hopeless to compete with the extensive mineral deposits in Germany whence most of the potash of commerce is now made

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THE *European Mail* notices that some of the notes appended to the replies to questions relating to ensilage, collected by the Agricultural Department, are very suggestive, and others are astonishing. For instance, Mr. W. James, of Rodborough, Gloucestershire, states that twenty cows were the same time eating sixteen acres of hay as they were in consuming four acres of clover silage, although they had roots and cake with the light hay and none with the silage. Surely there must have been a very light crop of hay and a very heavy one of clover to give such a tremendous difference in feeding capability. The same witness remarks that sweet silage does not keep, on exposure, as well as sour silage. That is true, because deterioration has done its worst in the case of the sour silage, and has not commenced previous to exposure in that of the sweet silage. Several witnesses remark that the chief advantage of ensilage is that it enables farmers to grow and preserve two green crops in the same season on the same land. One witness declares that the economy of ensilage is so great that, in spite of having a short root crop, he will be able to winter his usual numbers of 116 head of cattle and 1,200 sheep, and to sell 100 to 150 tons of hay as well. Experience has taught most ensilors the importance of keeping silage out of the cowhouse at milking time, of requiring men who have handled silage to wash their hands before milking, and of removing the milk as quickly as possible from the cowhouse. Such precautions against the tainting of milk are not necessary where sweet silage only is made. The following summary of the opinions of witnesses who have tested the effects of silage, upon the quantity and quality of milk and butter produced by cows fed on it, is as conclusive as evidence could well be in favour of the system of ensilage :—

	Milk.	Butter.
No change	22	1
Improved in quantity and quality... ...	95	15
Decreased quantity and deteriorated quality...	1	—
Increased quantity	93	13
Decreased quantity	3	2
Improved quality	34	28
Deteriorated quality	7	3
Improved quality and decreased quantity ..	4	—
Increased quantity and deteriorated quality ..	5	—
Favourable results (whether in quantity or quality not stated)	30	15
Unfavourable result	—	1
Total number of opinions ...	294	79

The evidence does not warrant any general conclusions as to the quantities of silage most advantageous for stock of different kinds and ages, as practice varies exceedingly in this respect.

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Forestry has published, from time to time, a series of interesting papers by the late Professor Walker Arnott, entitled "Historical notice of some celebrated trees." The last 'notice' is of much interest, and runs as follows :—

Before concluding, I cannot refrain from drawing your attention to the *Draceae draco*, or dragon tree. I mentioned that the age of certain, but not of all plants, could be ascertained by means of the annual layers, and that the palms showed no layers. Now, although the *Dracaea* is not a palm, it belongs equally with them to the great class of monocotyledonous plants, in which the deposit of woody matter is made in quite a different way from what we observe in the oaks, limes, cypresses, and others we have enumerated, all of which belong to the dicotyledonous tribe of vegetables. Now among those which have no annual rings the *Dracaena* stands pre-eminent, and of these the famous dragon tree of the city of Orotava, in Teneriffe, furnishes a case of longevity perhaps transcending that of the oldest baobabs, or of the Mexican cypresses. This tree has been visited by many competent observers, and among others by that prince of scientific travellers, the veteran Humboldt, who has given a good figure of it as it appeared about 70 years ago, from a drawing made by M. Ozonne in 1776. A later and much fuller account was published in 1827 by M. Berthelot, and a fine figure of the multilated trunk, as it appeared after the terrible storm of the 21st July 1819, forms one of the most striking pictorial illustrations of Webb and Berthelot's *Histoire Naturelle des Iles Canaries.*

The trunk is by no means equal in size to some of the dicotyledonous trees I have noticed. It is only 50 feet in girth at the base and not more than 60 or 70 in height. But, at the discovery of Teneriffe in 1402, over 4½ centuries ago, this dragon tree was nearly as large as at the present time, and had been immemorially an object of veneration among the natives. After the conquest, at the close of the fifteenth century, the trunk was employed as a boundary in dividing the lands, and as such is mentioned in ancient documents. It had changed very little since that period, until the summer of 1819, when a third of its spreading top was carried away by a tempest. But it still continues to vegetate, and its remaining branches are annually crowned, as they have been each returning autumn, perhaps for several thousands of years, with its beautiful clusters of white, lily-like blossoms—emblems of "the eternal youth of nature.' In regard to its real age, however, the usual means of investigation are defective, on account of the want of annual layers or rings ; and apart from historic evidence, we can only form a somewhat conjectural estimate, by a comparison with young trees of the same species. M. Berthelot, who assiduously devoted many years to the study of the civil and natural history of the Canary Islands, and who has therefore attempted the comparison under the most favourable circumstances, declares that the calculations he has made, upon the supposition that the trunk has increased in size even at the rate of young dragon trees up to within the last 800 or 1,000 years, have more than once confounded his imagination. We cannot therefore but assign the very highest antiquity to such a tree, which the storms and casualties of four centuries have scarcely changed, and conclude that in the vegetable kingdom there are many living antiquities, compared with which the celebrated pyramids of Egypt are but the mushrooms of a single day's duration.

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THE agricultural returns of Great Britain for 1885, which were published on October 26, are summarized as follows :—

The area reported in 1885 to be under all kinds of crops, bare fallow and grass, exclusive of heath and mountain land and of woods and plantations amounts to 32,544,000 acres, as compared with 32,465 000 acres in the previous year, showing an increase of about 79,000 acres. The respective additions in each division are nearly 36,000 acres for England, under 9,000 acres for Wales, and about 34,000 acres for Scotland. Some small portion of the increase is doubtless due to the more accurate returns made by farmers, but the reports of the collectors state that the greater part is caused by the enclosure and reclamation of moor or heath and waste land in different parts of the country. With regard to the details of particular crops in Great Britain, the most noticeable features as regards corn crops, apart from the decrease in the total, seem to be that there is a considerable diminution of the area under wheat and an increase in that under barley and oats. The diminution of the area under wheat is almost unanimously stated by the collectors to have been caused by the low prices obtainable for this grain in the autumn and winter of 1884. They observe, likewise, that the tendency among farmers to devote more land year after year to breeding and grazing stock, as offering prospects of better results, has again greatly influenced the more limited acreage of this cereal in all districts where the nature of the soil and climate do not generally promise the probability of large crops, and the returns in the aggregate confirm the correctness of their statements. Turning to the various kinds of live stock in Great Britain, there is a noteworthy increase in cattle. Sheep and lambs show a proportionately smaller addition, but in pigs there is a considerable decrease. There is also a further decline of 14,000 in agricultural horses, accounted for in the same manner as was the reduction in the numbers of this class in 1884 compared with the previous year—namely, the diminished need of them owing to the smaller quantity of land under corn crops and the more general use of steam applied to agricultural cultivation, enabling farmers thus to economise labour. As regards horned cattle, the numbers exhibit an important increase in each of the several classes, the total number being now 6,597,964, or 328,823 (equal to 5·2 per cent) more than in 1884, and 635,185 (or 10·7 per cent) more than in 1883, the figures of the present year being the largest yet recorded for cattle in these returns. Sheep and lambs taken together show this year an increase of 466,000 over the numbers in 1884. There is a further decline of 181,000, or 7 per cent, in the number of pigs in Great Britain, the total being now 2,403,000. The number of poultry in Great Britain as returned in 1885, exclusive of those kept in towns or by cottagers with less than a quarter of an acre of land, is 15,963,000 as compared with 16,061,000 in 1884, a decrease of 98,000 on the total of the several kinds of poultry included in the returns. The returns of the crops and live stock in Ireland show a decrease in the cultivated area. The diminution extends to corn crops, green crops, and permanent pasture, while flax and rotation grasses each show a relatively large increase. The cultivated area shows the diminution in the past year of 23,800 acres, the area being now 15,219,000 acres compared with 15,242,800. As regards live stock in Ireland, horses have increased from 480,846 in 1884 to 491,147 in 1885. The several descriptions of cattle are also greater in number, the total being 4,228,751, or 2·8 per cent more than last year. Sheep and lambs have both increased, the number of sheep being now 2,138,298, and of lambs 1,339,542. Pigs, on the other hand, are fewer by 2·8 per cent, as there are

this year only 1,269,122 against 1,306,195 in 1884—a decrease of 37,073. The number of poultry has increased from 12,746,000 in 1884 to 13,849,000 in 1885.

POONA BOTANICAL GARDENS.

The removal of the Botanical Gardens from Guneshkhind to Poona has formed the subject of some discussion between various Government officials who formed the Committee of Management. Before entering upon a review of the report, we cannot refrain from noticing the extraordinary delay which has occurred between the date of its submission by the Superintendent of the Gardens to the time of its receipt by us, which was only this week. The report itself is dated *25th May* 1885: and the discussions which it underwent ended on the *31st July last*. We are indebted to the courtesy of the various Local Governments and Administrations for the supply of papers of agricultural interest, and value them much; but when, as in the present case, papers are received so long after their publication, they lose half their interest. However, to resume our review.

The removal of the Gardens from Guneshkhind to Poona was commenced in July, 1884. The Superintendent complains of the bad soil of the garden, and the unsatisfactory water-supply, which, notwithstanding that a canal runs through the grounds, is rendered practically useless owing to the level of the water being so very low. This defect will, however, soon be remedied, as a new water-lift has been ordered out from England. The want of plant houses is much felt, but a sum of Rs. 3,000 having been sanctioned for this purpose, the difficulty ought soon to be removed. Paragraphs 16 to 27 are devoted to descriptions of the various plots, and how they have been planted. The Carob tree, *Ceratonia siliqua*, is receiving attention at the hands of the Superintendent. Among fruits the litchee, guava, plantain, orange, lime, pomelo and grape are mentioned as being under cultivation. Our personal recollections of the Nagpore orange and plantain are, that there are few places in India where they can be surpassed. They ought to do well at Poona, where the climate is all that can be desired. With regard to the Manilla hemp plant, the Superintendent remarks that he has 50; but that from previous experiments it is apparent that the difficulties in bringing to perfection the fibre are great, and that the cost of cultivation, &c., will not pay. He mentions the *Typha elephantina*. This is a plant of the bulrush order, and is said to form a good material for the manufacture of paper. The entire stock has been made over to a Parsee gentleman now in England, who is to have it tested there as to its paper-producing qualities. Arrowroot is also cultivated: but the Superintendent had not sufficient time for the experiment to say anything from personal experience; but he quotes the results obtained by Mr. Woodrow the previous year, which were that 200 square feet of land were cultivated, and the produce sold at the rate of Rs. 217 per acre. The weight obtained was at the rate of nearly 9 tons, 2 cwt. per acre.

The total expenditure during 1884-85 amounted to Rs. 11,811 as compared with Rs. 10,103 during the previous year. The total receipts during the same period amounted to Rs. 5,959, as compared with Rs. 4,916 in the previous year. The Superintendent complains of the paucity of his establishment, and asks for an increase. The conclusion we have come to after a perusal of the Superintendent's report is, that he is very considerably handicapped, both as regards the amount of funds at his disposal for expenditure, and the extent of his authority. That he is a practical horticulturist, we are fully convinced, but it seems that, if it is intended to turn this garden into a botanical repository, the idea of making it a self-supporting institution must be abandoned.

From the forwarding letter of the Collector of Poona, it would appear that the Government grant for the support of their garden is not sufficient. With reference to the question of a grant from local funds, either for the garden itself or the convenience of visitors, he thinks it would be inadmissible, and he would not recommend reliance being placed on the probability of obtaining private subscriptions. But that "if the Government grant is insufficient the only way is apparently to increase it when possible." This is exactly our own view of the case; we quite agree in his opinion that, "whatever may prove necessary in the long run, there is no doubt that the more money that is spent now, under proper supervision, on labor, the sooner will the gardens be presentable and instructive;" and he might have added 'the more economical will it prove in the end.'

Turning now to the discussions of the report by the members of the Committee, we find that much diversity of opinion was manifested as to the general *character* of the garden, and particularly as to the *name* it should bear. Mr. Ozanne, the Director of Agriculture, Bombay, expresses a very decided opinion against calling it a 'Botanical' garden, on the ground that the Superintendent's report is not encouraging, as he "does not understand botany"; and that it is practically intended to provide a recreation ground for the soldiers and civil population. He therefore thinks the name 'Botanical Garden' would be anomalous. At the same time, if it is ultimately decided to convert it into a Botanical garden, he thinks that it would be desirable to have the active co-operation of Mr. Woodrow, the lecturer on Botany and Agriculture in the Poona College of Science, as his knowledge of botany would be invaluable in this connection. Dr. Cooke, the Principal of the College of Science, who is also a member of the Committee, agrees with Mr. Ozanne that the garden ought not to be called the "Botanical Gardens," as the title is misleading; but he deprecates the *active* co-operation of Mr. Woodrow in the work of the gardens, on the ground, firstly, of his not having the time to do *so* efficiently at his disposal, and secondly, for the reason that "it is very easy for a man in the position of the Superintendent of a Garden to ensure the failure of an experiment, even while seeming to be most earnest in its prosecution"; and goes on to say that he is quite certain that "if Mr. Woodrow were put in such a position as to be able to give orders to Mr. Shearer (the Superintendent,) the latter would, to use a common-place but expressive phrase, have '*his back up*' at once." This is exactly what would happen, and we entirely endorse Dr. Cooke's opinion. *Divided responsibility* has never been found to work satisfactorily, although, as Dr. Cooke says, it 'has often been tried.' We do not, however, think that the garden would be benefited by being placed under the Director of Agriculture, as that functionary already has as much as he can do to supervise efficiently the various agricultural and model farms in the Western Presidency, without having a hand in the direction and working of the Poona Botanical Gardens. Dr. Cooke's arguments that botany and horticulture are distinct studies, is only true in a limited sense. Some of the most successful horticulturists of the age are renowned botanists; take, for example, Messrs. W. Bull, B. S. Williams, James Veitch, and a host of others. Sir Joseph Paxton, one of the ablest horticulturists of his time, was a renowned botanist, as the works he has left bear ample testimony. The average run of "*working*" gardeners are certainly not botanists, nor do they lay any claim to a knowledge of the science; but a man got out to fill the post of Superintendent of a Botanical Garden in India under a covenant, must be strangely wanting in training if he does not possess a knowledge of botany. If he is not competent to name and classify plants, or to refer a plant to a *natural order* after an anatomical examination, he is unfit to hold the post of Superintendent, carrying such a high salary (Rs. 350 per mensem) as that drawn by Mr. Shearer. We cannot help thinking that Mr. Ozanne has taken a one-sided view of Mr. Shearer's qualifications; and if the latter were accused of being ignorant of botany, he would no doubt be quite indignant, and consider himself a much maligned man.

We ourselves fail to see why these gardens should not be called (and worked as) the Botanical Gardens. The Acting Collector, Mr. East, is perfectly right in what he says that, if properly named and classified, living plants in a garden are not less instructive from a botanical point of view than their dried remains in a herbarium; and that the "claims of both the Kew and Regent's Park Gardens to be called botanical gardens would scarcely be disputed; yet for one person that frequents them for scientific purposes, a thousand go for instruction of a more popular kind, and many more for mere amusement.' The various Botanical Gardens scattered about India are not the less recreation grounds for their being called Botanical Gardens: and it seems quite absurd that the managing committee of the Poona Gardens should attach such importance to a name, even to the extent of abandoning or curtailing its sphere of action and usefulness. We might ask, in the words of the immortal William, "what is there in a name?" If we might be allowed to make a few suggestions, we would say that the best thing the Committee can do is to call the garden the "Botanical Gardens," and work it on the same principle as others of a similar character, and let the entire responsibility rest on the Superintendent. Mr. Woodrow may be allowed to *advise* Mr. Shearer where this becomes necessary, but no *active* interference should be permitted. Mr. Shearer should be answerable to some higher authority, say the Collector or Commissioner, for his share of the work. All *construction* should be carried out under the supervision of Mr. Shearer, as he will know best what is wanted, but the P. W. Department should *do* the work. Funds should not be stinted, as it is in the *beginning* that a definite plan of operations should be decided upon, for upon this much of the future success of the garden will depend.

Miscellaneous Items.

THE assay value of coins and bullion received in the Indian mints from the beginning of April to the end of October was Rs. 66,42,859, and of those coined and examined Rs. 6,88,03,280. Of the latter amount, Rs. 2,41,67,203 was coined in Calcutta, and Rs. 4,46,36,077 in Bombay.

DURING the first seven months of the current year the value of gold imported to this country was Rs. 1,95,92,265, and of that exported Rs. 17,23,056; whilst the value of silver imported was Rs. 7,19,22,826, and of that exported Rs. 47,87,891. This leaves a balance of both metals in favour of imports of Rs. 8,50,04,144.

LOCUSTS are reported to have caused considerable damage to crops in the Vriddhachalam taluk of the South Arcot Collectorate. The remedy adopted to get rid of them was to light fires to windward in the case of winged insects, and to destroy the immature insects by driving them into trenches and thus destroying them.

IT is said that when difficulty is experienced in keeping grass green under trees in open woods, particularly pine woods where the shade is continuous the year round, a little nitrate of soda sown occasionally throughout the growing season when the weather is moist will bring a fine crop of verdure pleasing to the eye and agreeable to cattle.

A NEW "everlasting" wood pavement has been brought out in France. The wood blocks are boiled in a solution of sulphate of zinc and chloride of sodium, mixed with a heavy mineral oil, linseed oil and tallow. The blocks are afterwards compressed to about one tenth their original volume. In this state they are said to practically defy wear and tear.

THE wood of Ailantus glandulosa, a tree common in India, is, in the opinion of American lumbermen, much more valuable than it has been usually regarded by us in this country. Indeed, here the tree is grown almost exclusively for ornamental planting, and without any purpose of commercial interest entering into the calculations of the planter. It appears in America, however, to be regarded as one of the very best timbers for fencing, for that purpose being quite equal to locust wood and also about equal to oak as fuel.

THE Agricultural Durbar was to have been held at Lucknow on the 3rd instant, the day after the opening of the Exhibition, which the collected zemindars will thus have every opportunity of seeing. The Exhibition will also be visited by his Excellency the Viceroy during this stay at Lucknow, and on another day it will be given up to the zenanas of Lucknow, admission free. This plan of opening the sights to native ladies was a great success at Calcutta, and it is satisfactory to find it repeated at Lucknow. The Exhibition will probably close about the 12th December.

THE quantity of tea exported from China and Japan to Great Britain from the commencement of the season to the 10th of November last was lbs. 125,764,471, as compared with lbs. 124,932,260, during the corresponding period of last year. The exports to the United Stated and Canada during the same period amounted to lbs. 59,367,852, as compared with lbs 57,897,325.

THE Hon'ble T. C. Hope left Bombay on Tuesday last for Bhopal, where he will meet Mr. Wilson Bell, the Agent and Chief Engineer of the New Indian Midland line, and Colonel Wallace, and in conjunction with them will arrange the plan of operations for the coming season. On leaving Bhopal, Mr. Hope proceeds to Umaria, to inspect the short span of line already constructed, which, when completed, is to open up the Umaria coal fields.

UNDER the title, *A Drop from the Indian Ocean*, Mr. Constable, who is so well known as an energetic member of the Lucknow Exhibition Committee, and who is singularly qualified to act as Mentor wherever industrial art and the higher flights of æstheticism are concerned, has published a most useful "Memorandum of Suggestions for the use of contributors to the Loan Collection Department of the Exhibition." These valuable "hints" are grouped under all the heads or classes into which the Exhibition is divided, and may be generalised as follows:—Products and Primary Manufactures, with their sub-divisions, minerals and ores, domestic pottery, metal-ware, &c. Arts and Industries, with their respective divisions: fine art, decorative musical instruments, jewellery, art-manufactures in metal, art manufactures in wood, ivory, &c., lapidaries' work, glass, textiles, embroideries, leathers and furs, articles of personal and domestic use, and a multifarious range of sub-divisions, the comprehensive character of which the official catalogue can alone do justice to. There are also suggestions relative to many special classes of exhibits.

Selections.

SUGAR AS FOOD FOR STOCK

IN the June *Sugar Cane*, page 297, we gave a paper by Sir J. B. Lawes, which was read before the Royal Agricultural Society of England, on this subject. Sir J. B. Lawes's experience was unfavourable, from an economical point of view, to the use of sugar for cattle feeding. The following letter, addressed to the *Queenslander*, shows that in that Colony it answers well:—

Sir,—I have read in your paper Sir John B. Lawes's experiment, "Sugar as Food for Stock," and as you invite correspondence, I send this letter. Two years ago a two-year-old draught entire of mine, through neglect, got in such low condition that he could hardly stand. Grass was scarce and dry, and corn, even when well cooked, would pass through his body undigested; besides, he did not care much about boiled corn, and he would not eat cracked corn, as he had a very bad lampas. The horse would drink milk, but as milk also was scarce I tried to make a substitute with sugar and flour dissolved in water. The horse took it, and I gave him five or six times a day one pint of sugar and one of flour dissolved in half a bucket of water. The result was wonderful. In a very few days he began to show a better coat, and to put on flesh, and having taken to boiled corn again—on which I put a sprinkle of sugar—his excrement showed that the corn was perfectly digested. So after a while I knocked off the sugar, and gave him the usual ration of corn and as much dry grass as he could get in the paddock. But very soon I had to return to the sugar, and I kept it up until some rain came to make the grass spring, for I could see the horse falling away and the food passing undigested. After again giving sugar the food was well digested, and the horse improved once more. A year ago I mowed some tussocky grass that was dry and white for several months before cutting. I built the haystack on top of a stable frame without tarpaulin or other covering over it. The hay was not good food then, and is certainly not improved since, and no stock will take a bite unless starved. By wetting this hay with diluted molasses or sugar it is preferred by the horse to good fresh lucerne hay, and if anything they are thriving better on it. The opinion that I have formed of sugar and molasses is this, and that although alone they are not able to sustain life, if fed in conjunction with other food rich in azote they enable the stomach to assimilate the maximum of nutritive matter contained in such food. I believe that roots play the same rôle as sugar when fed in addition to grain, oilcake or other rich food. Every butcher must have noticed that pigs stop fattening when they have no more grass to root, no matter how abundant the animal food fed to them. When water and sugar is added to common milk for infants' use it is to render the same more assimilable, although the amount of nutriment is reduced. Upon runs that have been stocked a long time with sheep we often see in those heavily-grassed plains after a dry spell the sheep and cattle perishing; still the tussocky grass is there yet, and although whitened, the nourishment is there all the same, only the stock cannot digest it. It is then that sugar or molasses would be invaluable. I recollect reading in the *Queenslander*, a few years ago, that a squatter in New South Wales, after losing heavily, saved the remainder of his sheep from dying through bad feed by giving a very small ration of bran or pollard. I am convinced that a far more feasible plan, and quite as good in effect, would be to fence the dam or waterhole, and water the sheep or cattle, or horses in troughs, and add a small quantity of molasses to the water: this plan would also have the advantage of saving the weak beasts from getting bogged. As I have stated, my experiments on a large scale were confined to horses, but of all the animals that I have tried there was not one that did not prefer water sweetened to pure water. Sir John B. Lawes, in giving the result of his experiment that lentil and bran is to lentil and sugar as twenty-four is to thirty-one, remarks that the pigs left the bran and starch for the sugar, thus proving that not only is it more valuable, but more relished. If ever there was a time when molasses was necessary to save losses in stock it is now in the Maranoa district. The best station in Australia will shear only 30,000 instead of the 130,000,000 sheep shorn last year, and the cattle are dying in hundreds in every water-hole, notwithstanding that every man willing to swing an axe is engaged for cutting myall. Travelling is out of the question; they are too far gone, and there are no horses fit for the work, all the best horses having been sent to Yeulba and Dalby to recover, and the rest are kept alive with lucerne, corn and pumpkins; still the tussocky grass is not done yet, and the best plan would be to give them molasses in water. But let us inquire if it is practicable. We can have lucerne hay, the best, delivered in Roma for £7 per ton; maize and wheat, £10; but molasses, although only the refuse of agricultural produce, is charged £7 per ton from Brisbane for carriage alone; to this add casks and other expenses and you will see that although the most suitable for our distress, it is the dearest food of all—far more so than the best grain. Why not charge the same price for a full truck of 5 tons as is charged for refuse of boiling-down establishments? If it was carried at, say, £2 per ton to Roma, we would quite willingly give £3 per ton to the sugar-planter; and at £5 per ton delivered in Roma it would be profitable feed to use as a rule and invaluable at present as a medicine against worms. The most ludicrous aspect of the question is this: that most of the molasses made is thrown away every year as useless, because distilling does not pay. See those tables from Pugh's Almanac:—

	Molasses. Gal.		Rum. Gal.
1875	438,950	made	343,244
1881	753,658	,,	157,325
1884	1,071,413	,,	144,073

Molasses increasing and rum decreasing! But this year the planter will not make low ration sugar, as it is unsaleable, so the amount of molasses not used will be enormous—and all lost! Considering the large increase in plantations since 1884, I consider that the molasses thrown away this year, if properly utilised, would produce more fat and flesh than all the maize and wheat produced in the colony, and so much wealth will be lost through excessive railway charges. A gentleman who is competent to express an opinion on the subject said to me the other day that half the squatters in the colony were insolvent, and the other half soon would be. I think the sugar planters are not much better, with their standing crop, scarcity of labour, and prices. Now one might help the other if only the matter could be arranged. I am convinced this is the only practicable way to save our stock from dying, for stock will take quicker to sugar than anything else—not excepting bran or corn.

I am, sir, &c.,
F. Calino.

Mount Abundance, 4th August.—*Queenslander.*

THE INDIAN FOREST SURVEY.

The following interesting paper was read before the Geographical section of the British Association, Aberdeen, on 11th September 1885, by Major F. Bailey, R.E., Superintendent, Forest Surveys, India:—

In his papers on the "Progress of Forestry in India," printed in the *Transactions of the Scottish Arboricultural Society* for 1884, Mr. Brandis, formerly Inspector General of Forests to the Government of India, writes as follows:—"The long period of peace, of good and just Government which followed the consolidation of the British Indian Empire, the construction of railways and other public works, and the rapid increase of trade and prosperity, have contributed much to accelerate the destruction of the forests of India. Over large tracts and entire provinces the forests have been cleared away to make way for the plough, and the increasing population, and when forests were left, most of the accessible timber was cut and brought away to be used as fuel and charcoal for shipbuilding, for railway sleepers, for bridges and other buildings. Hence it came to pass that forests, which in olden days were regarded as a thing to be got rid of, and as an obstacle to civilization, attracted attention, and that the necessity for preserving them began to be considered."

One of the first things to be done was to select and demarcate the principal forest tracts, so as to put a stop to further encroachments caused by the spread of cultivation, to free the demarcated area as far as possible from the rights which villagers and other persons possessed in them, and to frame a clear record of all rights which could not be so got rid of. The most important of the rights here referred to are the cutting of trees, tapping for resin, the collection of dead leaves from the ground, burning the grass, and the grazing of cattle, sheep, and goats. All of these, and many other such practices, are manifestly extremely hurtful to the forest, and unless they can be made to cease altogether, or at any rate unless they can be controlled and limited, forest conservation becomes impossible. But such rights are very difficult to deal with, for while on the one hand it is in the interest of the country at large that extensive and well-distributed areas should be permanently maintained under forest for the supply of timber and other produce to the population, the curtailment of them is frequently a matter of real hardship to the individuals who possess them. The fact that the continued exercise of injurious rights will ultimately destroy the forest, and thus render their further enjoyment impossible, is not recognised, and if this could be proved to the minds of the right holders they would not be much affected by it, as they are, generally speaking, satisfied if there is enough to provide for their own personal requirements without considering those of their descendants.

Although the Forest Act did not appear until 1878, the process of demarcation has been proceeding for the last thirty years, and the areas reserved on the 1st April 1883 were as follows:—

Bengal Presidency ...	35,667	square miles.
Madras	2,782	,,
Bombay	9,823	,,
Total ...	48,272	,,

or about 5½ per cent of the total area of British India, not including the Native States. The forests now consist of the principal areas to which cultivation had not extended at the time that the Forest Department commenced its operations, and the chief of them had been saved from destruction, either because, in the absence of communications, they were inaccessible, or because they occupied ground which is too much broken to be suited for farming purposes, or which cannot be irrigated. The principal forests consist of extensive tracts of wild, almost uninhabited country, situated either in the plains or on the low ranges of hills rising from them, or on the lower and middle slopes of the Himalayas up to an elevation of 8,000 or 9,000 feet above sea-level. The want of protective measures in former years has resulted in the most serious deterioration of the forests which have now been reserved, and they, in many instances, include within their boundaries considerable areas which are partially or entirely denuded of trees, or from which the valuable species have disappeared. The ground, especially on the great hill ranges, is still, however, generally speaking, more or less densely covered with trees and jungle, and in the mountains many of the slopes and ridges are covered with a dense growth extending over large areas. The gradual deterioration and ultimate extinction of forests has gone on in all countries, and is still unfortunately in progress; but the necessity for preserving those which remain, and for reclothing denuded mountain ranges, is now recognised in most civilised countries. In France very large sums have been expended annually for the last twenty years in afforesting the slopes of the Forest Alps, the denudation of which has resulted in the most disastrous floods, and Colonel Playfair told us yesterday that the most stringent measures are being taken by the French in Tunis to arrest the process of destruction of the forests of that country before it has gone too far.

In Burmah and in Southern and Central India, the principal trees are the teak and sandalwood; in the north-eastern portion of the peninsula the *sal* and the india-rubber tree are the most valuable species, while in the north-west the principal forests are stocked with *sal*, sissoo, and the cutch tree. These kinds are however, largely mixed with others, many of which are at the present time almost without value, and with bamboos. In the North-Western Himalayas the most valuable tree is the deodar, which is found mixed with several species of pines, firs, and maples, and also with elm, hornbeam, birch, and poplar.

Until the Forest Department undertook the management of these areas a few years ago, they were not thought to have any great value; it was supposed that they would supply the wants of the population in forest produce and grazing for ever, without the necessity for any special measures of protection, and nothing in the way of an accurate map of them was required. The system of management adopted by the Forest Department comprises not only protection against the illicit felling of trees and removal of produce, but also works of regeneration, such as planting and sowing, the making of export roads, inspection paths and timber slides, the cutting of climbers, protection against fire, and the sub-division of the forest into blocks and compartments with a view to arranging methodical plans of working. The damage done by fires in the Indian forests is enormous, and to control those which may break out, either within the boundary or on adjoining properties, a system of cleared lines is carried round and through the most valuable portions of forest, so that any block which becomes ignited may be isolated from the rest of the area. To enable a rational plan of working to be drawn up, so that the forest is secured against gradual extinction by the removal of more wood than can be replaced by the annual growth of the trees and by planting or sowing to replace those which are cut down, an enumeration of the trees, either over the whole forest or over representative areas of it, must be made. Such a "working-plan," or scheme of management, is essential for all forests. Trees cannot be dealt with like a crop of annuals which is sown and reaped in a single year; the age at which the most valuable timber trees are most profitably cut extends over several generations of men, and unless the principles of management are such as will conduce to the desired end, and unless continuity of aim and action can be maintained, failure is certain to follow. In order to guide and regulate the work of all kinds to be done in the forest, and to form the basis for a budget estimate, an annual plan of operations must be drawn out in which the work to be done in various localities is specified, and the lengths or areas are stated. The record of the rights of private persons or village communities within the forest must specify the parts of it in which each right can be exercised, while the roads or paths that may be used to lead cattle to certain springs of water, and the like information, must be clearly laid down. The boundaries and positions of all boundary marks must be recorded, so that further encroachments on the forest may be rendered impossible. Lastly, a careful record of all operations and of their results must be kept for future guidance. All this manifestly necessitates the provision of maps capable of showing a considerable amount of detail.

The Imperial Survey Department undertakes the preparation of maps on scales varying from 2 in. to 16 in = 1 mile of lands which are assessed and which pay revenue, the rest of the country being surveyed by the Topographical Branch on the scale of 1 in. = 1 mile Waste lands, or forests of comparatively small extent, lying enclosed within the assessed lands, are usually represented in the maps of the Revenue Survey Branch; but such lands are unassessed, either because they consist of broken ground, or because they are covered with dense jungle, or because they cannot be irrigated, and the accurate survey of such ground being both difficult and expensive the preparation of fully detailed maps of them was not, a few years ago, considered to be warranted by the use that could be made of them for revenue purposes; hence it follows that when such tracts were shown in the revenue maps, they were usually surveyed in less detail than the cultivated and revenue-paying country. But the most extensive and valuable forest tracts are situated within the area dealt with by the Topographical Branch, and thus it follows that maps of them on a larger scale than 1 in. = 1 mile cannot be looked for from the Imperial Survey Department.

In the early days of forest management, maps on small scales and without much detail sufficed; but it is obvious that, to fulfil the numerous requirements which a more rational system involved, detailed maps on a large scale became an absolute necessity, and in 1872 measures were taken to provide them. It would have been inconvenient to the Surveyor-General's Department to be called upon to undertake the survey on an unusual scale of numerous comparatively small areas scattered throughout the country, while it was recognised that the maps were destined to meet special departmental requirements, and that there would be many advantages if their preparation were entrusted to a special branch of the Forest Department working under the control of the Surveyor-General. This arrangement was therefore ordered, and it has since worked most satisfactorily; the Superintendent of Forest Surveys has largely profited by the relationship in which he has been placed to the Surveyor-General, and at the same time the Government has secured a guarantee as to the quality of the work executed by him.

The scale on which the forest maps should be drawn formed the subject of much discussion, and in 1874 the officer who had been appointed Superintendent of Forest Surveys, happening to be on leave in England, was deputed by the Secretary of State to visit the Forest Survey Offices in France, Saxony, Bavaria, and Baden, in order to study the system adopted in the preparation of forest maps in those countries. On the one hand, it was essential that when the ground was gone over, the survey should be made on a sufficiently large scale to answer the special requirements on account of which it was undertaken, and that it should be executed on such a system and with such a degree of accuracy as would admit of its being made the basis of any further work that might subsequently be required; while on the other hand, as the cost of a survey increases at a high rate with an increase in the scale, it was necessary to adopt the smallest scale that could be made to answer the purpose. Ultimately it was decided that for the more valuable forests the scale should usually be 4 in. = 1 mile, while for those of less importance half the scale would suffice; and this has, generally speaking been found suitable, though larger scales have occasionally been adopted for small, areas of exceptional value.

The scale determined, the superintendent had to raise and organize an establishment of surveyors and labourers, and he was fortunate enough at the outset to secure the services of Mr. W. H. Reynolds, an assistant Conservator of Forests in the Panjab, who has been for some years in the Imperial Survey Department, and also of three European surveyors, who had likewise been employed in the same Department. Aided by these gentlemen, and acting under the advice at all times so readily afforded him by the Surveyor-General (General Walker), he raised and trained a party of native surveyors, with whom he commenced to carry out the work before him. The first survey undertaken was that of the forests of Dehra Dun, in the North-Western Provinces. These forests, which cover an area of 578 square miles, are much interlaced with private lands, and as no good map of the latter then existed, it was thought desirable to construct a complete map of the entire district, the forests being surveyed by the new department, and the private lands by a party of the Imperial Survey. This joint work was not finally completed until 1876; but in 1875, when it was drawing to a close, the survey of the forests of Kumaun and Garhwal, also situated in the North-Western Provinces, and embracing an area of some 1,400 square miles, was commenced, and this has lately been completed. The survey of about 1,600 square miles of forest and private land in the Haiderabad Assigned Districts was commenced in 1881, and is now in progress. Altogether, since 1872, an area of about 8,000 square miles has been surveyed and mapped, nearly the whole of it on the scale of 4 inches = 1 mile.

Manifestly it will take a considerable number of years to work over the whole area, about 36,000 square miles, of reserve forests in the Bengal Presidency; but the preparation of detailed maps of the whole of these forests is not fortunately a matter of urgency at the present time, since for those which are in a backward condition, and in which nothing but simple protection can be undertaken for some years to come, any small-scale map with the boundaries marked on it, or a sketch-map, can be made to suffice for present necessities. A great deal of work has been accomplished by the Forest Survey Department, in the way of laying down boundaries on existing maps, and such maps have been found extremely useful, for it is very important that something of the sort should be placed as soon as possible in the hands of the officers who are charged with the management of the forests.

When the survey party takes the field at the beginning of the cold season, the officer in charge finds himself in command of a small army of 25 to 30 surveyors, European and native, and perhaps 150 to 200 chainmen, flagmen, and others, for whose accommodation tents, clothes, food, and cooking apparatus have to be carried; then there are the instruments and tools required for the work, so that the amount of baggage is very considerable. To carry all this he has to hire camels or bullock-carts, and the whole party then marches by stages of from twelve to fifteen miles a day from its head quarters to the scene of the work, where the men are at once distributed over the ground. Each native surveyor is provided with the requisite number of chainmen and flagmen, as well as with the needful instruments and tools, and a definite piece of work is assigned to him. Four or five native surveyors are placed under the orders of one European surveyor, who is held responsible to the superintendent for the work done by them; it is his business to visit them constantly and check their work, himself giving the finishing touches to it, and he has a piece of independent work of his own in hand at the same time on which to occupy himself when he finds the opportunity. A camp computing office is established in some central position, and such computations as are needed at once are worked out as the field-books are sent in. The survey thus proceeds in the field for some six or eight months, and when, with the increasing heat, the forests begin to become unhealthy, or when sufficient work of this kind has been accomplished, the party moves back to head-quarters. Chainmen and flagmen are then discharged, or placed on half-pay, and the rest of the establishment is employed either in drawing maps or in computing the triangulation for the next session's work.

Considerable skill and experience are needed for the efficient control of such work, which, if not properly supervised and arranged, is sure to show this in inferior quality, insufficient quantity, or high rates. No hard-and-fast rules can be laid down for the execution of surveys; the officer in charge must vary the procedure according to circumstances, with reference to the nature of the ground and the requirements of each particular case in the way of amount and accuracy of detail. It is of course quite possible to produce accurate detailed maps of the most unpromising country, if time and money are of no importance; but as this is not usually the case, it has to be carefully considered how a map that will answer the required purpose can be produced in the shortest possible time and at the smallest possible cost, and all expensive processes, which are out of proportion to the rest of the work, must be studiously avoided.

The ground worked over by the Forest Survey Department often presents exceptional difficulties, of which some of the principal are the following. The ground is frequently very much broken and intricate; the crop of trees, fortunately for the country if not so from the surveyor's point of view, is often very dense, and where this is not the case, there is frequently a thick growth of bamboos or tall grass on the ground; it is very generally the case that good drinking water is obtainable only in certain places, at long distances apart; the forests are often infested with dangerous wild animals; and as a rule there is considerable difficulty in obtaining supplies of food, and great liability to attacks of jungle fever. The want of good water is frequently a cause of serious delay in the execution of the work, and, as the principal item of expenditure is formed by the wages of the men employed, it follows that slow progress means a high rate per acre. The surveyors must camp in the neighbourhood of a spring of good water, and if it is not near their work, they lose a great portion of each day in going out to and returning from the part of the forest in which they are employed—men climbing hills all day in a heavy jungle with a hot sun overhead are apt to drink a great deal of water, and if it be of bad quality, they are liable to be attacked by jungle fever or dysentery, and, in spite of all precautions that are taken to avoid it, a considerable number of the men are annually laid up with fever towards the end of the field season when the hot weather is coming on.

The wild animals which inhabit the Indian forest afford excellent sport for those who have the time to engage in it, which the surveyors have not, for the out-turn of good work of this sort is in direct proportion to the time spent on it, and arrears of surveying and mapping cannot be brought up by a stroke of genius; but to the unarmed native surveyor the presence of dangerous wild beasts in the forest in which he is called upon to work, affords no attraction, and cases have occurred in which they have caused the most serious inconvenience. On one occasion a native surveyor, having seen a wild elephant, decamped and could not be persuaded to re-enter that part of the forest, while his accounts of the terrors of the locality spread among the other men, and for a long time the ground could not be surveyed. On another occasion three native surveyors having seen a tiger, climbed a rock and remained there all night. In the morning they managed to convey an appeal to the officer in charge to come to their relief, which he did, but without seeing anything of the tiger. This place was also in disfavour for some time afterwards. But a much worse case was that of the Jarhwal man-eater; this tiger had killed a very large number, some 300 or 400 it was said, of wood-cutters within the area which had to be surveyed. The superintendent was aware that if he lost one of his men, he would probably be obliged to abandon the work, and he took all means in his power to accomplish its destruction; but although the trail was twice followed, and the bodies of men who had been carried off were discovered, the tiger was not bagged. At last, as none of the survey party were touched, an idea gained ground among the men that the tiger bore them no ill-will, and they considered themselves perfectly safe, if they could satisfy him of their identity, which they were content to do by carrying aloft in a cleft bamboo, an old envelope from the superintendent's waste-paper basket!

The natives present a strange mixture of bravery and cowardice; they do not hesitate to express fear when they feel it, and do not seem to think that to be afraid is anything to be ashamed of, but at the same time they frequently perform acts that appear recklessly brave. An old man of seventy, armed with a tulwar, has been seen hunting about in the tall grass for a wounded tiger which was lying concealed close by him, and he had ultimately to be forced into a position of safety on the back of an elephant. On another occasion a bear had taken up his quarters in a dense part of the forest, and had killed several bamboo cutters, who had unwittingly invaded his retreat; a man who had just been mauled by him insisted in joining a passing Englishman, who went in search of the bear, and could not be persuaded to keep behind the rifle, but advanced boldly into the beast's lair, anxious to take a leading part in the retribution which shortly overtook him. The servant of a noted sportsman in the North-Western Provinces once proposed to his master, that he should walk past a dense piece of cover in which a wounded tiger was lying, in order that the animal might be induced to spring out into the open, and thus afford a good shot!

Much may be done with such men, not only in the defence of our frontiers from foreign aggression, but also in more peaceable work such as that which is now treated of. The experience of the natives of India gained in the Forest Survey Department has been that, with skilful training and under judicious management, almost anything may be done with them. From the very beginning they were taught that accuracy was of far more importance than rapidity of work or anything else; if a native surveyor thinks that his officer is not very particular, and would not be sorry to show a large outturn of work even at the sacrifice of something in the way of accuracy, he can develop the most astonishing powers of "fudging" To make certain that nothing of this sort should become the practice of the Forest Survey Department, a good deal of time was at first *spent*, not *wasted*, in encouraging the men to bring to notice discrepancies which occured in their work, and in making them go over it again in order to bring it perfectly right, the officers being most careful never to be angry or impatient with them on account of any errors brought to notice in this manner. Thus a solid foundation for the execution of correct work was laid, and if progress was at first slow, and the cost of the survey was proportionately high, the men soon became more skilful, and the instances in which the ground had to be gone over a second time became fewer. In the beginning only, the more simple parts of the work were assigned to the native surveyors, and their drawings, which were not always very neatly executed, were incorporated in the field-sheet prepared by the European surveyor; but some of the best of them were not satisfied to execute work of this class only, and they qualified themselves by degrees to complete their field sheets almost entirely with their own hands, while a few of them can now sketch in the eye-contours with great accuracy, neatness, and artistic taste, always, as has been explained, under the careful and constant supervision of a European surveyor. The combination of Native and European labour in the Forest Survey Department has worked extremely well.

Detailed surveys of wild and densely-wooded country have rarely been made before in India, and in spite of the large proportion of the work which is done by cheap native agency, and the adoption of special methods of procedure to suit the exceptional nature of the undertaking, it is evident that such surveys as those described are likely to be more expensive than similar work in open, cultivated country. An additional cause for a comparatively high rate lies in the fact that the forest not infrequently consists of detached blocks, and this necessitates much moving about during the progress of the work. But the revenue derived from the Indian forests has largely expanded during the last few years, while the condition of the forests themselves has been greatly improved and their capital value enormously increased.

Good maps facilitate systematic and economical management, and enable work to be carried out and recorded in a manner which would be impossible without them; and to provide such maps, even at a somewhat high rate as compared with the cost of other maps on the same scale, is a necessity and a distinct economy.

LIMBURGER CHEESE.

Many there are who have heard and read of it; numbers have smelled of and sniffed at it, and have sworn they would have no closer acquaintance; but they have returned to the charge, and from smelling have proceeded to taste, and as in acquiring the taste for tobacco and opium, and of a few disagreeable things, have contracted a fondness for the article, and soon declared that it is the best cheese made. Others, and especially Germans and Hollanders, need not acquire the taste; a fondness for it seems to be a part of their make-up.

While the taste of this cheese when young is rich and creamy, and the flavor not particularly strong, its powerful odour when fully ripened has been likened to everything offensive, and the cheese, with its consumers, have by some become the theme of reviling and ridicule.

As its name indicates, Limburger had its origin in the province of Limburg, in Holland, where, with its peculiarity of shape, smell, process of making, and curing, it was formerly exclusively made. Thirty years ago its production in the United States was almost unknown, it being at that time thought, on account of the difference in climate and pasturage, impossible to produce it here. The same notion in regard to Swiss cheese prevailed, and consequently enormous quantities of both were imported from Europe to supply the large demand in this country. But it was found that both can and have been produced in this country in such perfection that the very best judges are unable to detect any difference from the imported article.

Thousands of tons of Limburger are now produced every season, mostly in the states of New York and Wisconsin, at a cost of less than half of the imported article. It finds its market and is consumed mostly in those cities containing a large proportion of Germans, Chicago, Milwaukee, St. Louis and New York. It is more profitable to the farmer and maker than any other kind of cheese; first, because from a given quantity of milk more weight is obtained, owing to the mode of making, and also because the price it brings is usually from ten to forty per cent higher than that obtained from the standard American cheese. In neighbourhoods where its manufacture has been commenced, it usually spreads to the exclusion of other kinds. Even the fastidious, shrewd Yankee, with his everlasting eye to the main chance, has found that the odour so execrable at first smells somehow of greenbacks.

In Green county, Wis, hundreds of tons are made annually, more than twenty factories being engaged in the manufacture. In Dodge and Jefferson counties large quantities are also made.

The cheese is made in factories capable of working the milk from 100 to 400 cows, rarely exceeding the latter number, as more would require a larger area of country than would be desirable on account of the factory, as the milk is hauled and the cheese made twice a day usually. The makers generally buy the milk from the farmer at a price agreed upon for the season of six months, beginning about May 1st. The process of manufacture in its first stage does not differ from the usual way, except that a lower temperature is kept while the curd is forming, the animal heat alone in summer being often high enough. Great care is taken to use pure milk, free from taint or filth, and cleanliness is requisite in every stage of making. Upon the curd being formed, it is slowly and carefully cut into square pieces the size of dice, low temperature, and careful handling being necessary to avoid breaking the butter globules, upon which the richness of the cheese depends. It is slightly scalded and stirred, most of the whey drawn off, and without being salted, the curd is dipped out into perforated wooden boxes or mould, about five inches square, and left to drain without any pressure being applied. In a few hours the packages are carried into the curing cellar, and placed edgeways on shelves, like bricks set up to dry. Every day thereafter they are rolled in salt, and replaced when they have absorbed enough salt. They are turned almost every day, and the slimy moisture which exudes is rubbed with the hand evenly over the surface, which serves the double purpose of keeping the cheese moist and to close all cracks, into which flies might lay their eggs. This outside moisture decomposes while the cheese ripens, and being mostly composed of albumen, like fresh meat, eggs, etc., the same results follow the decomposition, and in this case the Limburger odour is developed, which never forsakes it, and sticks closer than a brother to all who touch or eat it. After eight or ten weeks it is packed in paper and tin foil, and is ready for market—in consistence, contents and nutriment the richest cheese that can be made, but, to the uninitiated, a malicious, predetermined outrage upon the organs of smell.—*California Patron.*

THE SILOS AND ENSILAGE RETURNS.

THE new 'Agricultural Department' of the Privy Council, as was noticed in our columns last week, have published a bulky and very interesting volume containing replies to a series of questions issued by the department to fully 1,200 owners of silos in Great Britain. Returns were received respecting 963 silos in England, 59 in Wales, and 161 in Scotland, representing nearly double the number of silos that were in operation in 1884 and the number is still being increased. While the majority of the silos appear to be on landowners' home farms, the practice of storing green fodder in this way seems to be making some way amongst tenant-farmers.

Where new buildings have to be constructed, farmers in backward times are naturally reluctant to incur the expense of silos, but in many instances old buildings, with some patching up, have been rendered suitable by an expenditure of only a few pounds. There was probably more than the lack of suitable buildings deterring agriculturists from extensive silo work. Many were doubtless, with characteristic caution, prevented from spending much money in that direction by a fear that the system would not prove a success. The first few years of its operations, however, convinced even the more sceptical that there was "something in the silo and in silage," hence the great increase in the number of silos as compared even with last year—nearly double.

The success of the system may be held as established, for among the 1,183 returns obtained, there are very few failures noted, and those that did occur, were traceable to mismanagement. Many details in the management are not yet sufficiently known to all who have tried ensilage to enable mistakes to be avoided. Year by year, however, those errors may be expected to diminish. A comparison of the various experiences should be of great service to those operating with the silo, and that can be obtained from a perusal of the volume recently issued, which may be procured for the reasonable sum of twenty pence, exclusive of postage, through any bookseller.

It would have been noticed from what was published last week, that though the means by which the silage was made, differred somewhat, there is substantial unanimity as to the results. A few inches at the sides of the silos, as well as on the top, were unfit for food, but as a rule the rest was good, and was readily consumed by stock. Most animals did not relish it at the outset, but by-and-by took kindly to it. Young, growing cattle seem to have thriven best on silage. It kept them glossy in coat and in fair flesh, without turnips, and with a little cake, as well as straw or hay, and water. Fattening stock, it is believed, benefited by this new diet, materially aided, of course, as it was, by cake-meal, &c.; but its advantages are not so pronounced with fattening stock, as with growing animals and with dairy cows. It would seem that its value in the production of milk and butter is not quite so high as many were at one time led to believe. That is to say, it is not so much superior in the dairy to other and more common food for milk cows as has often been claimed for it.

It is difficult when cows are fed chiefly on silage, especially for some weeks after the diet has been commenced, to prevent a taint or 'taste' of the silage in the milk. That is about the only drawback to its extensive use among milk cows, and it is not so striking as it was. Those who supply comparatively small quantities daily to their cows, along with other foods, have not had much to complain of as regards taint of either milk or butter; but when silage wholly, or almost so, takes the place of roots, the milk does not so readily escape. Further experience, however, should enable owners of milk cows to modify the allowances of silage so that they would not predominate unpleasantly over the other stuffs in the dietary.

As to the safety of silage as food for cows heavy in calf, there are still doubts in some quarters, and consequently it has not been extensively given to animals in that condition. In-lamb ewes have been fed with it, and with no obviously bad consequences, while it is capital food for ewes after lambing and before grass comes sufficiently up. Given to young, growing cattle, the returns and remarks thereon show that silage has been a safe and a successful article of food—promoting growth and maintaining health.

The comparisons of the cost of haymaking with that of ensilage are interesting. Generally they are in favour of the former, when the season is dry and suitable; but how often is it that? There is doubtless more carting, packing, and weighting when the fodder is green than there is with hay thoroughly dried in the field or meadow; but then there is more hand labour at least with the hay, before it reaches the stack, than is required for the silage raw material, and there is the difficulty of getting it safely dried to be taken into account. One great advantage that the silo has, is that the forage can be put in in a wet state. No doubt it gives best results when it is deposited with no more moisture than the natural 'sap' of the plants newly cut, but the results are wonderfully good where the grass and corn or vetches, as the case may be, are put into the silo in damp condition.

In moist climates, such as that of the west of Scotland and the north-west of England, where hay-making is often so tedious, and where there is so much grass land too, the advantages of the silo seem to be undoubted. Silos enable the storing of winter food for stock to be proceeded with in weather that it could not go on in under any other known process. That is no mean consideration. Some of the finest English-made natural hay would be ill to beat as an article of food for stock. Ensilage cannot surpass it, in our opinion; but, as some of the correspondents assert, first-class ensilage is better than second-class hay, and in wet seasons much of the hay is of a second or third rate character.

In a dry climate, such as that of East Lothian, there is less occasion for silos, especially when much of the hay is sold off the farm; but on strong land, in almost any part of the country, where root-growing is treacherous, the means of making ensilage might with advantage be within the reach of every farmer. Beans peas, vetches, oats, and sown grasses, grow well on clay soils, while turnips are rather uncertain, and the former are the more suitable articles for the silo. Prickly comfrey has been introduced, but has not proved very satisfactory. Again, where, as in some parts of the west, there is a comparatively small acreage of turnips and a large portion under grass, the chief elements of successful and profitable ensilage present themselves.

Now that silos in Britain have got beyond the merely experimental stage, we hope to hear of a large increase in their number during the next few years. Not that we think ensilage is likely to supersede root culture, but it should lessen the area somewhat of that very expensive crop, and enable the farmer to tide his stock over critical periods more economically and better than he has hitherto been able to do.—*North British Agriculturist.*

HOLLOWAY'S OINTMENT AND PILLS.—Old Wounds, Sores and Ulcers.—Daily experience confirms the fact which has triumphed over opposition for thirty years—viz., that no means are known equal to Holloway's remedies for curing bad legs, sores, wounds, diseases of the skin, erysipelas, abscesses, burns, scalds, and in truth, all cases where the skin is broken. To cure these infirmities quickly is of primary importance, as the compulsory confinement indoors weakens the general health. The ready means of cure are found in Holloway's Ointment and Pills, which heal the sores and expel their cause. In the very worst cases the Ointment has succeeded in effecting a perfect cure, after every other means has failed of giving any relief. Desperate cases best display its virtues.

EXCHANGE AND THE INDIAN WHEAT TRADE.

THE *St. James's Gazette* of the 24th ultimo says:—We understand that one day last week a single house sold no fewer than thirteen cargoes of Indian wheat, shipped or about to be shipped, for delivery on arrival. We have in this an illustration of the extraordinary stimulus given to the export of wheat from India by the fall in silver. No doubt the effect of the fall has been heightened by the prospect of disturbances in the Balkan Peninsula; but the main cause of the large shipments is unquestionably the fall in silver. If a single house does so large a business in a single day, it will be understood how considerable must be the total business doing. No doubt so large an increase in the trade tends to raise exchanges, and it may be expected that, whatever Congress does with the Bland Act in its coming session, there will be a rise in the Indian exchanges by-and-by. If the Bland Act is not repealed the rise may be so great as to stop the export from India, unless there is a considerable rise in the price of wheat in Europe. Already there has been a rise in consequence of the events in the Balkan Peninsula. Should the prospect of a general war increase, the rise in wheat might be very considerable, and thus, in spite of an advance in the exchanges, the Indian exports might still continue to expand; but if the price of wheat does not rise, a rise in the exchange would undoubtedly check the exports; and should the Bland Act not be repealed, the rise in the exchange would be sufficient to reduce the exports to the scale of last year, probably.

The largeness of the exports of wheat from India render less probable that it seemed some time ago a rise in price. As the harvest was deficient both in the United States and in Russia, it was assumed, generally, that after Christmas there must be a considerable advance. It was known, of course, that the stocks of wheat all over the world are large, and it was assumed that the poverty of our farmers would compel them to hurry their corn to market as soon as they got it ready; but after a few months, the general impression was that there must be a considerable and sharp advance. The fall in silvers, however, changed the situation completely. That fall has rendered it possible to export wheat with a profit from India, even at the present price. We are informed that shippers have a margin of about 2½ per cent, after paying all commissions and other charges Should such a margin be maintained, it is the belief of those who are most competent to form an opinion that India can supply all wheat required by Western Europe. Much depends, however, upon the course of the silver market, and upon the weather in India. If the Bland Act should not be repealed it is, of course, probable that silver will rise considerably. Should it do so, it would hardly be possible, we presume, to continue those large shipments from India. Again, Indian wheat is being sown just now, and will be reaped early in the spring. It is believed that the heavy rains put the land in excellent condition, and the prospect is regarded, so far, as highly favourable at present. Should the weather throughout the winter prove equally favourable, it is estimated that the harvest next year will be even larger than any harvest hitherto; for, whatever may be the profits on shipping, it seems to be undoubted that the growers have received fairly remunerative prices, and that they will be tempted, therefore, to sow a larger area than ever. But, on the other hand, if the weather should prove very unfavourable, the harvest would be deficient, and then there must be either a considerable rise of price to tempt farmers to sell, or the exports would immediately fall off. Assuming, however, that the depreciation of silver continues, and that the weather in India is favourable, there seems every reason to conclude that India can go on selling at present prices all the wheat that we require.

THE DELAY IN THE DELIVERY OF INDIAN TEA.

WE have recently inserted several letters from dealers in the London market, complaining of the great difficulty they have in obtaining delivery of tea when they buy it. It would appear that, on an average, about a week elapses between the day of sale and the furnishing of the weight notes to the buyer. Charges have been made by some of our correspondents of importers printing their tea for sale before the ship had actually entered the docks; but we trust that such occurrences are very infrequent, as we can scarcely believe that any respectable selling broker would habitually countenance so objectionable a course. It has not escaped our notice, however, that during the last week or two there have been several large invoices withdrawn from sale, and reprinted a few days later. No reason, of course, was assigned for the postponement, but it was quite understood by everybody in the market that the tea was not ready for sale when the catalogues were issued. We must express our conviction that the best interests of the Indian tea trade must suffer by such undue haste. It would seem as if everything must give way to crowding the tea into public sale directly it reaches this country. Hence arise complaints of careless bulking. Perhaps a break of fifty chests fine Broken Pekoe in an invoice may be ten short when the bulking operation commences, but the importer will not wait till the cargo is all discharged. The warehouse-keeper must bulk what he has got, and if the remaining ten chests are received a few days later, they can be bulked by themselves, or perhaps left as they are. How can such a system work other than mischief to the trade? And that it is of constant occurrence we have good reason to believe. Again, an importer is in great haste to sell an invoice of tea on a certain day. He communicates his wishes to his brokers, who pass them on to the warehouse keeper. It may be a large consignment, and the time allowed quite too short. What then? The chests are opened and emptied out on the floor in heaps, and for days after, such heaps have been known to lie upon the warehouse floor exposed to all the pernicious influences of London fog and damp, before the warehouse-keepers' staff could find the time to fill the tea back into the chests. Of course, one or two chests had been filled, and put on show for the trade to draw samples from for the sale; but the remainder of the break was all the while absorbing damp. This is no secret to those who understand the way things are worked in the busy season; and we can well understand how, with such facts staring them in the face, dealers were ready to welcome the new system of bulking in India as a move in the right direction.

We should have been glad to have had a word from the opposite side. All our correspondents were plaintiffs, and put forward their charges in strong terms. There may be extenuating circumstances that have not yet been brought before the bar of public opinion, and having opened our columns for the free discussion of the whole matter, both as regards the delay in delivery question, as well as the size of the sampling breaks, or indeed any matter which affects the well-being of the Indian tea trade, we are still ready to insert any answer that can be made from the other side. We hope judgment will not be allowed to go against the importers by default.

We observe that the Committee of the London Wholesale Tea Dealers' Association are now taking the matter into consideration, probably with a view to the revision of the public sale conditions, and as there is certainly a grievance proved so far, it would be well if the matter were approached in a spirit of mutual good will, and with a desire to accommodate one another, rather than that the feeling of annoyance which prompted one of our correspondents to say that "life in the tea trade was not worth living," should any longer exist.—*Home and Colonial Mail.*

EXPERIENCE WITH CHICKENS.

THE best egg-producing food I have found is a mixture of oatmeal and bran in the proportions of one-third oatmeal to two of bran mixed with boiling water, and fed in the morning only. It should be well mixed and not too moist, so dry you can squeeze no water from it, in fact in a crumbly condition. The oatmeal is fattening and stimulating, but inclined to be binding, while, on the other hand, the bran is light and easily digested, and counteracts the binding effects of the oatmeal.

The chickens should have exercise after eating. If fed at night, it is apt to sour in their crops, perhaps harden and make them crop bound. But chickens need a change of diet, so I frequently substitute wheat middlings or corn meal for the oatmeal, but stick to the bran. At night I feed wheat cracked corn and buckwheat mixed. No screenings or refuse of the mills for my fowls. The best is good enough for them and the cheapest.

After feeding bran as above a few times, my egg product ran up from seven to twelve, fifteen, and even as many as twenty-five eggs a day from twenty seven hens, in cold weather, when they were confined to their houses. My flock gets all the scraps from the table, and occasionally I buy a pound or so of meat, chopped fine and give it to them raw. They do not need this when they run at large and pick up worms and bugs.

Whole corn is good for a night food in winter, but is too heating for hot weather. They will eat whole oats, but if fed with wheat will eat the wheat first every time. It is well to alternate the ration of grains. Chickens like variety, and in their wild native state they get it.

The old fowls, or mature fowls, should have a small pinch of salt mixed with their morning food, as it will tend to keep them from plucking the feathers from each other and eating them. I think hens crave the saline taste at the end of the feathers. Salt in any quantity is fatal to little chicks, I have lost fifty this season in consequence of their having eaten food intended for the old ones.

Feed regularly, keep clean, treat kindly, and all ordinary fowls will reciprocate with a good yield of eggs. Keeping clean means they must have clean, well ventilated houses, and nests so sweet and clean that a hen will not feel it disagreeable to lay in them.

As to feeding young chickens, if they run with the mother they will require but little attention. Give them the bran and meal mixture three or four times a day, and small grain. Scatter pin-head oatmeal raw and where they can get it, but not as an exclusive diet. Bread soaked in warm milk, or even water, they are fond of. Some fanciers tell me that young chickens must have milk, but I have never seen an old hen give any, and as I have not any milk my chickens do not get any, and I have about 150 specimens from one week to two months old, and they are as healthy and lively as crickets.

I do not believe in the French plan of confining young fowls to one position and stuffing them by machinery in order to fatten them. This is unnatural and barbarous. An abundance of good food and proper care will make good broilers, and one only has to go to the flock and select what he wants in order to secure a delicious meal.

Cleanliness in the hennery is rightly declared to be one of the chief essentials to success in keeping fowl. This is the season when fowls are most tormented with various kinds of vermin. Their houses should be fumigated with a brimstone smudge, then whitewashed, while a little sulphur or Persian powder blown into the feathers of the fowls will expel their enemies and save much unproductive labor.—*Cor., N. Y. Advertiser.*

A SKILFUL SURGICAL OPERATION.

The American Ambassador at Vienna, Mr. Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billorth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one-third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended wth the following symptoms :—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "all gone" sensation ; a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation ; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow ; the hands and feet become cold and sticky—a cold perspiration. The sufferer feels tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times ; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often-times there is a palpitation of the heart, and the patient fears he may have heart-disease. Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomes closed, or nearly so. Although this disease is indeed alarming, sufferers with the above-named symptoms should not feel nervous, for nine hundred and ninety-nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner. The safest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White (Limited), 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

St. Mary-street, Peterborough.
November 29th, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia; but after a few doses of the Syrup, I found relief and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr. A. J. White. William Brent.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer described it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Sd.) Vincent A. Wills,
To Mr. A. J. White. Chemist-Dentist, Merthyr Tydvil.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

Preston, Sept. 21st, 1883.

My dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully, in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.

I am, dear Sir, yours faithfully,
To A. J. White, Esq. (Signed) W. Bowker.

Spanish Town, Jamaica, West Indies, October 24, 1882.

Dear Sir,—I write to inform you that I have derived great benefit from "Seigel's Syrup." For some years I have suffered from liver complaint with its many and varied concomitant evils, so that my life was a perpetual misery. Twelve months ago I was induced to try Seigel's Syrup, and although rather sceptical, having tried so many reputed infallible remedies, I determined to give it at least a fair trial. In two or three days I felt considerably better, and now at the end of twelve months (having continued taking it), I am glad to say that I am a different being altogether. It is said of certain pens that they "come as a boon and a blessing to men," and I have no reason to doubt the truthfulness of the statement. I can truly say, however, that Seigel's Syrup has come as a "boon and a blessing" to me. I have recommended it to several fellow-sufferers from this distressing complaint, and their testimony is quite in accordance with my own. Gratitude for the benefit I have derived from the excellent preparation, prompts me to furnish you with this unsolicited testimonial.

I am, dear Sir,
Yours ever gratefully,
(Signed) Carey B. Berry,
A. J. White, Esq. Baptist Missionary.

Hensingham, Whitehaven, October 16, 1882.

Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,
(C.) (Signed) John H. Lightfoot.

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THE INDIAN AGRICULTURIST.

A WEEKLY

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VOL. X.] CALCUTTA :—SATURDAY, DECEMBER 12, 1885. [No. 50

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 2ND DECEMBER.]

Madras.—General prospects fair; continue favourable in Bellary and Anantaporo.

Bombay.—River continues low in Sind. Reaping of *kharif* and sowing of *rabi* crops in progress in several districts. More rain wanted for *rabi* crops in two talukas of Poona, one of Nasik, and two of Khandesh, and in parts of Ahmednugger. Standing crops suffering from drought in parts of Ahmednugger, and from blight in parts of Bijaporo Cholera and cattle-disease in parts of nine, fever in parts of sixteen, and small-pox in parts of five districts.

Bengal.—No rain during the week. Cold weather has fairly set in. Rain and wind of the previous week have done some damage to standing crops in East Bengal. *Amun* harvest is progressing, generally with prospect of a good outturn, except in flooded tracts. *Rabi* crops are coming up well, but in parts of Behar and Hazaribagh these crops and poppy are somewhat backward for want of rain Public health continues generally fair. Rice cheaper than last year in almost all districts.

N.-W. P. and Oudh.—Weather continues seasonable. Rain would be beneficial for *rabi* sowings where there is no irrigation. Prices are generally steady, and markets well supplied. Public health fair.

Central Provinces—Prospects continue favourable. The *rabi* sowings are completed, except in the Chuttisgurh division, and the harvesting of the *kharif* is in full swing. Weather unusually cold.

Assam.—Weather seasonable. Public health fair. *Kulajar* seems still to be lingering here and there in the Luki tehsil. Prospects of all crops good. Reaping of *sali* crops progresses. Common rice 16 seers per rupee. Tea season is rapidly closing.

Mysore and Coorg.—Standing crops in good condition. Harvesting of *ragi* continues; Bengal gram, *jowari* and paddy being sown. Cattle disease reported in Kolar, Kadur and Shimoga districts. Prospects of season good. Public health good, except in the Tumkur and Shimoga districts,* where fever and dysentery are prevalent. Water and pasturage abundant. Prices fluctuating.

Berar and Hyderabad.—Weather clear and cold. Jowar reaping and cotton gathering continues. Prospects of crops goods. Wheat 22, *jowari* 26 seers per rupee in Amraoti. *Rabi* and *bi* crops prospering. Fever and ague in some talukas. Cholera abated in the Pathur taluka. Prices in Hyderabad—wheat 14½, coarse rice 12½, white *juar* 20½, yellow *juar* 27, and *tur* 15¼ seers per current sicca rupee.

Central India States.—Prospects good, weather seasonable. Health good, cholera still exists in Rewa city. *Rabi* and opium crops doing well Opium sowing in progress in Manporo.

Rajpootana—Weather clear and colder. Tanks and wells good in all places, except Sirohi, Pertabgurh, Meywar. Kerowli, and Dholepore, where they are drying. Fever still prevails in Marwar and Harowti. *Rabi* sowings in progress, completed in some parts. Crops average. Small-pox slightly prevalent in Meywar, where prices are rising. *Kharif* crops being gathered in Kotah. Prices steady. Outturn of *kharif* in Ulwar much below average.

Letters to the Editor.

RHEA GRASS.

TO THE EDITOR.

SIR,—In your issue of the 18th July last you published an article from the *Planters' Gazette* (English paper) regarding the cultivation of Rhea Grass. Will you kindly state how I can put myself in communication with "J. H L" who contributed that article? Is the *Planters' Gazette* published in India, and if so, where?

ONE INTERESTED.

Pulicat, December 1, 1885.

NOTE.—The *Planters' Gazette* is published in London; and the best way for our correspondent to put himself in communication with "J. H. L," would be to address the Editor of that paper, who will no doubt do the needful.—ED., *I. A.*

FISH MANURE FOR TEA GARDENS.

TO THE EDITOR.

SIR,—"An Enquirer," whose letter appeared in your issue of the 28th ultimo, asks me a series of questions on the subject of *Fish Manure for Tea Gardens.* I will reply *seriatim* :—

1st. To fish manure a tea garden of 50 acres.—This will cost about Rs. 150, or nearly one rupee per *bigah.*

2nd. Proportion of application. One to one and-a-half maund of rotten *poontee*, or any other kind of oily fish will be found sufficient to fertilize one *bigah*, that is, a handful of this manure is sufficient for one bush.

3rd. I have never enquired the price of fish-manure in the market, as whenever it was required we generally prepared it ourselves. I am therefore unable to say where it can be obtained.

4th. Where fish-manure was used. In a garden in Assam, also in one at Madras situated on the Hills (I omit names here) fish-manure was used to renovate the soil, as the out-turn of these two tea gardens had fallen off in flavour and quantity, though they had been well manipulated. The fish-manure proved effectual.

HEM CHUNDRA DUTTA.

December 7, 1885.

THE JUTE INDUSTRY.

TO THE EDITOR OF THE "STATESMAN."

SIR,—The depression in jute stocks still continues; remedy after remedy is suggested, the usual want of unanimity exists; some few close for a time, that remedy fails; unless all are agreed, it could have but one result; half-time, or short hours, is then put forward, and as from the beginning of time, the under-current of petty jealousy that pervades all inter-European dealings in this country prevails, and again no unanimity. This state of affairs is bad enough, and the depreciation in value during the past two years has been terrible; but surely, if agents cannot agree in one common action, as regards the working of the various mills in their charge, they can be unanimous on the subject of the Government Jute Mills. It is a positive and crying shame that neither of themselves, nor through the Chamber of Commerce, have they made any representation regarding it, and it is intolerable, because not conducted either on a small scale, or with a view to make prisoners understand that the labour is punitive. During the Poojah holidays the Government opposition was in full swing; and can any one even in the Government service say that instructing persons to become skilled labourers is any punishment: is it a fact? It is reported that criminals that should be treated with the greatest severity, convicted of no ordinary crimes, are put on to work in the Government opposition Mill. Surely working hand looms is no punishment, and now when numbers of industrious hands are not only thrown out of employment, but can hardly keep body and soul together, convicted criminals, no matter what the offence, are being fed and clothed, sooner or later to be sent into the world with a sum of money to their credit, and further to glut the market with their skilled labour, and the produce of this very Mill is forced on the market, and sold to the highest bidder in competition with the labour of honest men. It is only in this country, where no one seems to be in authority that such scandalous work is allowed to exist. It would be more than instructive to know what class of criminals have lately been forced on to this Mill work; it would give some of the native papers a subject to write on, to see thousands of their honest countrymen barely able to exist, owing to the terrible depression in the jute trade and Government pampering criminals of a bad class to add further supplies to the present over-production. It is becoming positively appalling, the apathy that has come over investors; daily they see the shares in River Steam Companies falling (every fall of Rs. 10 in India General means 5 lakhs). Jute stock is positively unsaleable, and yet this Government Mill is allowed placidly to continue its operations at a loss, and no one in authority takes any step to point out the enormity of the proceeding, and enormity it is. Every one knows connected with the industry, that with the strictest economy bags can only be made at a loss, and here we have a large Government Mill actually working and selling its product. On the face of these facts, and what is still more reprehensible, turning out time expired men as skilled labourers to compete with the honest industry of natives who have had during the last year to feel the results of the depressed trade. It would be tolerated in no other country in the world, and it shows conclusively how utterly blind and oblivious every official is to everything unconnected with his own work, and how he is trained up in the belief that opposition to every non-official industry is a sacred duty, and to listen for a moment to any honest objections to their system or procedure is to stamp you as an opponent to the true interests of the natives, and only guided by your rapacity; and Mr. Gladstone expressed it as "arrogant assertion;" and sufferers like myself are to sit still, and see a wholesale manufacture carried on at a dead loss by criminals of the worst class in direct opposition to my own trade. The Government Jute Mills are not self supporting; they cannot be, and no figures they can produce will prove to me that if they buy jute to-day, they can turn out into a marketable article except at a loss, and if they have the audacity to assert, as I believe they do, that they are working at a profit, I am sure any agent of a Calcutta Mill on an inspection of their books will prove to them the contrary. There was some sense in employing criminals to build Port and breakwater; but it is a crime on the part of Government to assist in stifling an industry like the manufacture of jute in times like the present, and their competition is of the worst kind; they are answerable to no one, and their accounts are not submitted to the scrutiny of accountants accustomed to deal with mill returns and results. Fancy Bombay putting up with such an anomaly as this. I do not doubt their loyalty, but I am convinced if it had been continued in the face of such repeated remonstrances and warnings and promises from the head of the State, it would cease. The Alipore jail would long ago have been gutted, and it is such continued disregard of public feeling, much less offence against popular prejudice, that has been the cause of many a mill in the old country being levelled to the ground. Many statements have been furnished me with regard to the Alipore Mill as run by the Secretary of State for India, but there is no necessity in going below the surface; the mill exists, it turns out a large quantity of stuff, and it is sold regardless of market or consequences, and it should be and must be stopped, and every agent of a mill who permits it to continue without a remonstrance, not once but repeated, until Lord Ripon's promise is fulfilled, is not doing his duty. I have dwelt on the subject and will, with your permission, continue to refer to it until I awaken the Chamber of Commerce or the mill agents to the folly of permitting its continuance. Can any of them answer me this question? To what extent have the hand looms been increased lately, and is it a fact that within the last few months criminals of the very worst class have been put on to the work, because they were short-handed—in fact, were and are driving full power? Are there any statistics as to the outturn of this mill, or is the production sold and far more than outsiders are aware of, without being taken into the calculation of mill outturns? Will Government go on half time if all others agree? Does not this last question prove the impropriety of their connection with a trade that may require such an arrangement? How can they with their prisoners employed in such work? Their tendency is and has been to increase not by steam power but by hand power, and you will be told and led to believe such work is a punishment; a positive farce known to all, but it opens the door to any increase they may choose, and will they tell me such Superintendents as Mr. Beadon will give heed to any remonstrance? No, the evil has grown and is growing, and many who read this will say it is a fuss about a small affair; will such reader with this answer, supply me with the outturn from Alipore during 1883, 1884, and 1885, and say then if it is a fuss?

A JUTE SHAREHOLDER.

Editorial Notes.

In another column will be found the prospectus and regulations of the International Exhibition of Industry, Science, and Art to be held at Edinburgh in 1886. The executive committee are very anxious to have exhibits from India, and have expressed a hope that the exhibitors from the various presidencies at the London Exhibition may be induced to send duplicates of articles to that at Edinburgh.

⁂

The Madras Government have sanctioned the removal of the Monthol fish-curing yard to a more favorable site at Madakara, about two miles south of Mahé. The new site is reported to promise well, as it is the residence of about 200 fishermen with seventeen deep sea-nets and thirty-four fishing boats, while the old one had but few fishermen resident in the vicinity, and was unfavorably situated for fish-curing purposes in a cocoanut tope.

There was an auction sale of Cinchona bark held at Madras, on the 5th ultimo. The total amount realised was Rs. 56,531. All the barks sold very well, compared with the prices obtained at the last sales, especially the Naduvatam renewed crown bark and the Dodabetta root and natural crown bark. Another point also worthy of note is that the price per pound in English money is higher in every case, excepting one, than that obtained for the same kind in the London market according to the last quotations.

We understand that his Highness the Maharaja of Cooch-Behar, with the view of gaining a proper representation of the *Fauna* and resources of his territory in the forthcoming Colonial and Indian Exhibiton, has made a grant of £500, together with skins of animals and birds found in Cooch-Behar; and the Government of India has commissioned Mr. Rowland Ward, F.G.S., the naturalist of Piccadilly, London, to produce from the material a picturesque trophy of great importance for the coming Exhibition. Probably other Indian Princes will, in like manner, illustrate their territories.

Mr. Thomas Wardle, F.C.S., F.G.S., the well known authority on all matter relating to the manufacture and dyeing of silk was a passenger by the mail arriving in Bombay on the 8th instant, with instructions from the Royal Commission for the Colonial and Indian Exhibition of 1886 to visit the silk districts of India in order to make a collection of Indian silks, both raw and manufactured, with a view to stimulating the development of all the silk products of India and their utilisation in Europe. Our readers will remember the notices we recently published of Mr. Wardle's exertions in this connection. We suppose that Mr. Wardle will turn his attention chiefly to the *tusser* silk industry, which is indigenous to India, and which, under proper management, may be expected to achieve extraordinary results.

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The following is the report on the condition of the cotton and til crops in the N.-W. Provinces and Oudh, for the month of October 1885:—

Division.	Crop in full average condition.	Condition of Cotton Crop.	Condition of Til Crop.
Meerut ...	100	75	67
Rohilkhund ...		50	33
Agra ...		58	42
Allahabad ...		75	58
Benares ...		75	67
Jhansi ...		67	67
Tarai (District) ...		58	83
Lucknow ...		67	58
Sitapore ...		42	33
Fyzabad ...		67	67
Roy Bareilly ...		67	58

⁂

The Superintendent of the Madras Survey, Colonel H. T. Rogers, in a recent letter to the Madras Government, pointed out that the shortest time in which the revenue and topographical survey of the presidency can be completed is 16 years, and that the survey of extension of cultivation, the re-demarcation and re-survey of districts, which have never been permanently demarcated, and miscellaneous work of various kinds will extend this period to quite 20 years with the present establishment, and that it would therefore appear premature to prepare now any scheme for contracting the department to its lowest permanent limits.

The work remaining to be done is as follows:—

Original Survey—		
Revenue	16,278	square miles.
Topographical	19,391	"
Re-demarcation and Re-survey—		
Revenue	8,852	"
Extension of Cultivation—		
Revenue	1,247·52	"
Total ...	45,776·52	

THE following is Messrs. Lloyd and Carter's memo. of Indian Tea :—

FOR WEEK ENDING 12TH NOVEMBER 1885.

	Indian. Packages.	Ceylon. Packages.	Java. Packages.
Offered	23,194 ...	1,253 ...	1.107
Sold about	20,000 ...	1,253 ...	1,107

There has been rather less offered during the week, and the demand has been fairly steady, though occasionally thin undesirable parcels have gone a shade easier. Pekoes under 1s. do not attract notice, though cheap; good Pekoe Souchongs being preferred. A telegram from Calcutta, dated yesterday, states that the total export for the season to Great Britain will not exceed 64,000,000 lbs. (about the same as last season); from this amount will have to be deducted the cargo of the *Indus* which has become a total wreck. China teas keep very firm. To-day's auctions, amounting to 4,500 chests, have been postponed until to-morrow, owing to fog.

⁂

A CORRESPONDENT of one of our American exchanges, writing about an experiment tried by him with unleached wood ashes to prevent the ravages of the cabbage worm and the deposit of eggs on the plants by the "millers," says :

> "I took dry, unleached wood ashes full strength and splashed right on top of each plant, from a half to a full stove shovel full, determined to kill the worms if it killed the cabbage (which was sure of total destruction any way, if no better remedy could be found than has been applied), and, to my satisfaction and almost astonishment, the first application proved a radical cure, killing almost instantly every worm touched by the ashes. I took pains to jar the plant, by hitting it lightly with my foot, to shake the ashes thoroughly between the leaves, to be sure to make soap of every worm. The plants were not only uninjured by the ashes, but started with new life and energy. The swarm of millers which had constantly hovered over the patch seemed to leave in disgust, and no further trouble was experienced for several weeks, but a rapid and unmolested growth of the plant ensued."

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THE Superintendent of Stationery, Madras, has submitted the following memo. on the condition and prospects of paper manufacture in the Madras presidency :—

> Paper is manufactured in the districts of Madras, Chingleput, Godavari, North Arcot, Madura, Cuddapah, Tinnevelly and Coimbatore. The manufacture is for the most part done by hand, and the process is therefore rude, and the paper made coarse. The materials used in the manufacture are chiefly waste paper, old rags, gunny bags, hemp and aloe. Plantain leaves are also used in some places. There are lots of other materials available from which good paper can be made, such as cotton, rice, straw, bamboos, refuse of sugar-cane and grasses of various descriptions, but they are not used for want of suitable machinery. The quantities manufactured in each district are not known, but they cannot be large. The Stationery Department purchases from the manufacturers at Madras about 7,000 reams annually, and the papers so purchased are used for covers chiefly. There is no prospect of the manufacture improving unless machinery is introduced and manufacture undertaken on a large scale.

The Board of Revenue, in forwarding the above to Government, remarked that the samples furnished showed the paper to be generally of very inferior quality. A few samples from Madras town, North Arcot and Tinnevelly are described as being suitable for ordinary covers; but the paper readily absorbs moisture and is much eaten by insects. "It is therefore unsuitable for official correspondence." Madras is, we think, very much behind the times in paper manufacture. Our Bengal mills turn out very creditable qualities of paper. For that matter, the mills at Lucknow do a very good business too, and the specimens of paper that we have seen turned out by the latter are certainly suitable "for official correspondence."

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THE Dutch Colonists in Sumatra have discovered, hidden behind a belt of the densest jungle, petroleum wells which are expected, under proper management, to yield a handsome return. At the depth of one hundred feet, the wells begin to spout water, gas, and petroleum mixed. Deeper down, there is less water and more oil; and the enterprising Dutch engineers have a notion, like Mr Besant's hero in the *Golden Butterfly*, that they will, ere long, tap one of the greatest of earth's oil-tanks. No preparations, however, have yet been made to store the rush; and the product of the trial borings is given away to the Malays, who drive a large trade in it. A natural basin-like hollow collects the wastage from the wells: and a match thrown into this hollow leads to a general conflagration, which gives satisfactory proof of the purity of the petroleum. The only difficulty connected with the wells is their difficulty of access, for jungle has to be penetrated in places on all fours, through dense thickets of creepers and acres of fallen trees.

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THE Calcutta *Journal of Medicine* publishes an important statement as to the efficacy of *Cocaine*, as a local application in the case of severe burns. The statement is taken from the *Practitioner*, and is as follows :

> Dr. Weiss writes: On December 25th, I was called to Professor L——. An atomiser which he was using had exploded, the hot steam badly scalding the Professor's lips, nose, eyelids, cheeks, and forehead. The pain was so intense that I apprehended general convulsions. I sent for sundry topical remedies, amongst them a two-per-cent solution of *hydrochlorate of cocaine*. In the meanwhile I covered the injured parts with pieces of cloth dipped in olive oil; on the top of these I applied ice-water compresses renewing them every minute, without affording the slightest relief. When the medicaments arrived, I touched the injured part with a hair-pencil dipped in the *cocaine* solution. I had scarcely finished, when all pain had entirely vanished without any return. At my visit in the evening, I found the patient quite easy and in good spirits.

It would be of interest to learn that this simple remedy had been tried with success in the Calcutta hospitals.

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THE Cashmere correspondent of a Bombay contemporary, writing from Srinuggur, under date 25th November, says :—

> The approach of the cold weather has brought back to us the earthquakes that did so much mischief and caused so much alarm during the greater part of the summer. Every evening this week there has been a shock, and sometimes one during the night, and occasionally in the day time. At six o'clock this evening there was a shock which sensibly affected the house and all that was in it; in a few seconds it was gone, but unpleasant memories have been aroused by these repeated visitations. The most severe of recent shocks was on the night of Sunday, the 15th, at about eleven o'clock; this shock was almost as severe as the first great shock in May last, and drove some persons out of their houses. There is a peculiarity now in the mode of working, if such a term may be used in reference to these subterranean shakings and eccentricities. Last night, for instance, the rumbling sound that precedes so many shocks took place four times without any shock or trembling of the earth; these noises could not be mistaken for thunder, for there was not a cloud in the sky and the moon is near the full. Again, during the stillness of the evening, not a breath of wind is stirring. A trembling is sometimes sensibly felt in the earth, but there is no shaking of the house, nor any noise like subdued thunder. What do these peculiar movements indicate?

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SIR ALFRED LYALL is reported to have held an Agricultural Durbar at Lucknow on the 3rd instant, in connection with the Agricultural Exhibition—that is, a durbar for the reception of people interested in the agriculture of the province. Some fifty or sixty talukdars and zemindars from the North-West and Oudh, who had interested themselves in the promotion of agricultural improvements, were present. Prior to his Honor's arrival, several important agricultural matters were discussed, and resolutions were voted, and recorded. The native gentlemen invited to the Durbar were then presented in the usual way to the Lieutenant-Governor by Mr. Smeaton, Director of Agriculture and Commerce. His Honor addressed the Durbaris, thanked them for their voluntary labours during the past year in supplying the Director with monthly forecasts of the condition and prospects of the principal export crops, and hoped they would continue their assistance. He urged the prosecution of agricultural improvements, and trusted some substantial results would be forthcoming on the occasion of the next durbar. A full report of the proceedings, which were of no ordinary interest, will be found elsewhere.

ON the 21st October last, the Dewan of Mysore delivered his usual annual address in which he reviewed the administration of the province during the past year. Amongst other matters he made the following statement regarding the collection and scrutiny of statistics :—

The imminence of the famine this year has brought to notice some defects in the present machinery for the collection and scrutiny of statistics—agricultural, vital, and economic. For a small province like Mysore, it may perhaps not be necessary to have a separate Department of Agriculture, but it is absolutely necessary to have at the head-quarters an officer of standing and experience, who could "collect and deal with the statistical returns relating to the weather, the agriculture, the health and the well-being of the people, and thus secure the most prompt and accurate knowledge attainable of a probable failure of crops, and of the extent and consequences of any failure that actually takes place." In ordinary times, this work may not be sufficient for a separate officer. It is therefore in contemplation to combine the office of Director of Statistics with that of the Inspector General of Police and of Forests and Plantations. In connection with Forest legislation, he added that it is proposed to place the Department under an Inspector General of Forests and Plantations. The Government are training three students in the Forest School at Dehra Doon for the post of Assistant Conservators, and it is proposed eventually to give an officer of this class to each district.

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HIS remarks on the subject of pastures on the same occasion are of importance. He said :

The important subject of pasture reserves is also now engaging the attention of Government. In a country like Mysore where cattle-breeding is carried on to a large extent by the Government as well as by private individuals, the subject of pasture land is of the utmost importance. For the Government cattle, valuable pasture land has been reserved, and for private cattle the Survey Department has allotted to each village free gomal or pasture land, this allotment being supplemented yearly by the sale to the villagers of the right to graze on Government waste-land, which, in many places, is extensive. In ordinary seasons, the existing provision is understood to be sufficient. In years of scanty rain-fall, there is invariably a general cry against the insufficiency of the existing grazing provision, and all the District Officers and Amildars consulted, affirm that the cry is not without reason. The deficiency is generally met by temporarily placing the Reserved Forests at the disposal of villagers for the purpose of grazing, an arrangement inadequate in itself and not considered as a rule a safe one, as there is always a risk of the privilege being abused. It is, under the circumstances, proposed to make a permanent provision that may, to some extent, meet the requirements of good and bad years, and to make the ryot independent, as much as possible, of Government Reserved Forests. It is admitted that the present Amrut Mahal allotment is far in excess of what is actually utilized by the Government cattle, and it is therefore proposed to reduce it to some extent. When this is done, some of the surplus kavals would be utilized for fuel and pasture reserves, which could be thrown open to the public in exceptional years, while other surplus kavals could be placed at the disposal of the public on the moderate assessment of hulgaval tenure, and on the distinct understanding of liability to enhanced assessment for lands brought under cultivation. The experiment of preserving green fodder in silos is being carried on a large scale by the Military Secretary, who is in hopes of being able to report favourably upon it at an early date. The report, when received, will be published in the *Gazette* in English and Canarese.

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THE following is the report on the state of the season and prospects of the crops for the week ending 2nd December 1885 :—With the exception of the Madura district of Madras and the Dibrugurh district of Assam, no rain has been reported from any part of India during the past week. In the Madras presidency prospects are generally fair, and continue favourable in Bellary and Anantapore. In Mysore the standing crops are in good condition, and harvesting of *ragi* and sowing of gram, *jowari*, and paddy continue. Water and pasturage are abundant, but cattle-disease is reported from three districts. In Coorg the season promises well. In parts of the Poona, Nasik, Khandesh and Ahmednugger districts of the Bombay presidency, rain is wanted for *rabi* crops. Reaping of the *kharif* and sowing of the *rabi* crops continue in most districts. In the Berars and Hyderabad the crops promise well. In the Central India States and in most of the Rajpootana States the prospects of the crops are good ; but in Sirohi, Meywar, Keraull, and Dholpore tanks and wells are low. Prospects continue favourable in the Central Provinces and the *rabi* sowings are complete, except in the Chattisgurh division, and the *kharif* harvest is in active progress. In parts of the Punjab, rain is much needed ; *rabi* operations are in general progress. In the North-Western Provinces and Oudh the *rabi* promises well, but more rain would be beneficial for sowings. The weather continues seasonable. Some damage has been caused to crops in East Bengal by the rain and wind of the previous week. The *amun* harvest promises a good outturn and the *rabi* crops are coming up well, though in parts of Behar and Hazaribagh more rain would be beneficial for these and for poppy. Prospects continue good in Assam. No report has been received from British Burmah for the week under notice. The public health continues fair. Prices are falling in Coorg and are fluctuating in Mysore ; elsewhere they are generally steady. In Bengal the price of rice is lower than last year in almost all districts.

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IT may not be generally known that cotton of excellent quality is largely grown in the territory of H. H. the Maharaja of Hill Tipperah ; and that the produce is eagerly bought up by Calcutta firms for export to France, where it is utilized in the manufacture of broadcloth. The cotton is subject to an export duty, which realizes a considerable revenue ; and the result could be still more favourable to the finances of the State if the tariff were lowered, and direct collections substituted for the present system of farms. The Director of Agriculture recently enquired whether the khakee-coloured variety was produced, stating that 4 annas per pound would be given for cotton of that colour by the Superintendent of the Buxar Central Jail Samples of khakee-coloured cotton were promptly furnished to the latter officer, and he was informed that an unlimited supply could be given in a year or two, if sufficient encouragement were given to the cultivators. His report on the samples is not very encouraging, though it indicates, pretty clearly, the line which reform should take. He writes : "The khakee cotton is of an uniform colour but is rather pale, and as the staple is rather short, it will not make up by itself, and will have to be mixed with darker and better stapled stuff. If the State is adapted for growing cotton, I would recommend China Nankin seeds being sown, as that cotton is darker in colour, of a good long staple, besides being silky to the touch and in appearance." In view of the importance to the British army of a constant supply of cotton, innocent of the horrible native dye-stuffs, it might be worth while to supply cultivators with the China seed. Immense tracts exist in the hill territory, admirably adapted for the growth of every variety of cotton, and the reforms, which we understand are contemplated in the fiscal policy of the State, should give a great impetus to the cultivation of this important staple.

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IT would appear, from a paragraph published in the last number of the *Farmers' Review* to hand, that the large amount of wheat "in sight," that is, stored in elevators or in transit by rail or vessel, has more than anything else depressed the price of wheat in America and Europe. It is said to have increased since the harvest began from about 40,000,000 bushels to nearly or quite 50,000,000 bushels at this time, in spite of consumption and export. The recent large increase in "visible wheat" is largely due to the farmers in the north-western parts of the United States storing their wheat as they threshed it in the elevators of the railroad companies, taking receipts for it according to grade, and deliverable to them at their pleasure. This, says the *Review*, while a seeming advantage and convenience to them, has worked to their injury by so largely increasing the amount of "wheat in sight," as to cause the present break in the market by which a large share of the recent advance has been lost. It is safe to assume that if the wheat which the farmers have stored in the elevators had been stored on the farms, and kept "out of sight," this break would not have occurred. But it is difficult to sustain prices with 50,000,000 bushels in sight, and the amount showing a steady increase from week to week. In spite of this showing, the fact remains that the supply of wheat the world over is a short one, and this fact must sooner or later tell on prices, which, as we think, must advance materially before another crop is grown.

THE appeal made by the Chamber of Commerce to the owners of our local Jute Mills to reduce their time of working to four days in the week, seems to us so wise and reasonable, that we cannot but hope it will be responded to by a unanimous resolution of the Mills to act upon the advice. There is plainly but one remedy for the present state of matters within the reach of the Mills, and they should recognize this fact and act upon it, just as they would if the Mills were owned by a single Company, which found itself producing a larger quantity of goods than its customers could take off its hands. It seems to be admitted by every one that if the Mills work full time their production is in excess of the demand, and that there are no markets to which the Mills can look for the consumption of this excess. In these circumstances, the Mills should do just what would be done if they were the property of a single owner. The proprietor would face the fact that he had unduly extended his machinery, and pending the development of a natural and remunerative demand for his goods, he would limit his production to the quantity that was really in demand. Nearly the whole of the Mill Companies, we believe, see the wisdom of this course, but they are embarrassed by the refusal of one or two of their number—who are perhaps working under peculiarly favorable conditions—to join the movement. We may perhaps without offence remind these Companies, that there is a stronger tendency every day in the scientific world, to repudiate as unsound the purely selfish theories on which modern political economy has been based, and to recognise the fact that the higher wisdom which teaches us to "Look not every man upon his own things, but every man also upon the things of others" is alone consistent with true and healthful progress. It may not be reasonable or just that a hard-and-fast line of four days per week should be drawn as a provisional remedy for the evil to be adopted by all the Mills alike, but no objection of this order should prove fatal to the movement, if owners are but wise enough to recognize the fact that generous co-operation for a common purpose, and not mere competition, is the proper remedy for the existing state of matters. It is clear that the industry has, for the moment, been unduly extended, and the object of all parties should be to tide over the period that must elapse, before matters have righted themselves, with as little common sacrifice as possible.

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THE following figures from the Board of Trade returns for October 1885, we extract from a home contemporary :—

The Board of Trade Returns for October and the ten months ended 31st October have just been published, and shew that the value of our imports during the month amounted to £29,757,327, against £31,097,132 in 1884, and £35,833,755 in 1883, being a a decrease of 4·3 per cent as compared with 1884, and of 17 per cent as compared with 1883. The total for the ten months is £312,812,458, against £325,958 226 in 1884, and £355,123,514 in 1883—a decrease of 4 per cent and 11·9 per cent, respectively. The increase this month in the foreign export trade is almost entirely due to the larger shipments of wool to the Continent and the United States, and as the total has risen from 12,455,055 lbs., valued at £618,373, to 31,915,278 lbs., valued at £1,496,070, the increase is at once accounted for. In the import account, animals, living (for food), have declined from £953,823, to £601,978, or 36·9 per cent, owing to the combined circumstances of lower numbers and lessened values; articles of food and drink, admitted duty free, have declined from £9,903,870 to £9,770,280, or 1 3 per cent, and those on which duties are levied from £3,125,281 to £2,715,079, or 13·1 per cent, while tobacco has increased from £220,801 to £401,730, or nearly 82 per cent. Among the free imports wheat has increased from 3,826,636 cwt. to 4,6[illegible]2,664 cwt, oats from 895,990 cwt. to 1,200,022 cwt., and Indian corn from 1,303,872 cwt. to 2,658,313 cwt., while wheat flour has decreased from 1,243,442 cwt. to 1,104,760 cwt., and barley from 2,220,604 cwt. to 1,531,141 cwt., peas and beans also showing for smaller quantities. Bacon and hams have been more largely imported, but at lower prices, the latter with an increase of 4,748 cwt., being less in value by £15,836, and the same remark applies to many other articles of food; but unrefined sugar is certainly dearer, as, although the quantity has dropped from 1,233,026 cwt. to 971,674 cwt., the value has only fallen from £766,306 to £711,638.

With regard to the British exports of the month, there is an improvement shown in articles of food and drink, most of the items in this class having been more largely shipped, and the total value has consequently increased from £1,123,251 to £1,174,065, or 4·5 per cent. Animals, living, have declined from £17,275 to £41,897, or 11·4 per cent; and that notwithstanding the large shipments of British sheep's wool, especially to the United States.

The detailed figures with regard to the principal imports of raw materials and food are as follow :—

IMPORTS FOR OCTOBER.

Articles.	Quantities.	Inc. or Dec. per cent.	Value.	Inc. or Dec. per cent.
Cotton, raw ...	746,036 cwts.	26 98 *d.*	£2,098,747	28 20 *d.*
Flax ..	103,217 cwts.	9 87 *d.*	179,165	13·72 *d.*
Hemp ...	84,149 cwts.	28 85 *d*	126,686	28·71 *d.*
Jute ...	248,336 cwts.	8·89 *i.*	148,351	1·21 *d.*
Silk, raw ...	249,926 lbs.	53·18 *d.*	179,682	50·93 *d.*
Wool ...	771,426 loads	17·76 *i.*	1,764,623	16·78 *i.*
Wool	17,080,411 lbs.	2 44 *i.*	793,237	3 97 *i.*

ARTICLES OF FOOD, &C.

	1884.	1885.
Animals	£953,823	£601,978
Bacon	423,356	467,309
Beef	237,534	219,558
Butter	1,235,136	917,733
Cheese	556,719	370,501
Corn	3,800,285	4,138,488
Eggs	228,783	202,917
Fish	111,082	172,511
Hams	133,491	117,605
Lard	70,933	144,708
Meat	128,977	172,272
Pork ...	39,583	42,073
Potatoes	11,810	19,077
Poultry	70,454	71,422
Rice	251,224	262,779
Total ...	£8,253,190	£7,919,931

* *

THE following is a summary of the weather report for October last :—

With the exception of North-Western India, where the fine weather which set in in September continued uninterruptedly, the weather, though unmarked by any serious disturbance, has been in a generally unsettled state, and about the 12th assumed a somewhat threatening appearance over the Bay.

Throughout the month, the skies of Upper India and a large part of the Central Provinces were almost cloudless, and there was an almost total absence of rain. In nearly all other parts of India there was general rain throughout. On the western side of the peninsula, including Berar and Khandesh, rain fell daily until about the 12th, after which it ceased for about 12 days, when a slight and partial fall again took place on the South Concan coast. The winds in Western India were occasionally variable, but, on the whole, maintained their normal east-north-easterly direction down the valleys of the Nerbudda and Taptee, and a south-westerly direction on the South Concan coast. Further southward in Malabar and in the interior of the peninsula, in the same latitude, the break noticed above was hardly felt, and more or less rain fell throughout. In Madras also rain fell on almost every day; but the burst of heavy rain, which usually ushers in the autumn rains of the Carnatic, has not occurred. On the 29th the observer at Madras reported the setting in of the monsoon, but the rainfall on that day was slight, and a fall of 3½ inches on the 30th appears to have been due to local conditions. The rainfall has been below the average. Round the head of the Bay, and also in Eastern Bengal, Assam and Burmah, there were frequent showers about the middle of the month, and again between the 21st and 25th; but at other times, the weather was generally fair and abnormally warm.

The table at the close of the summary shows that, from the Punjab south-eastward down the Gangetic plain, as far as North Bengal and also in the Indus Valley, the rainfall of the month was insignificant. In Assam, Lower Bengal, round the head of the Bay, and westward into the Central Provinces, there was more rain; but here also, as well as in the Carnatic and Burmah, it was below the average. In the western parts of the country and in the central and southern parts of the peninsula, *viz.*, from Southern Rajpootana to Mysore, Malabar and Ceylon, there was a strongly marked excess—relatively greatest in the Berars and Khandesh, but very considerable in some of the other districts also.

On the 12th, a very decided fall of the barometer took place, not only over the Bay but throughout the whole of the Indian area, with the exception of the north-west. At the same time, the winds which, on the previous day, had been irregular and variable, became cyclonic round the Bay—blowing from west at Negapatam and Colombo; from south at Diamond Island; from north-east in Arakan and Lower Bengal; and from north north west along the west coast of the Bay between Gopalpore and Madras. It was evident that a large low-pressure area had been formed over the Bay. The next day the reports showed the barometer still falling, and that the storm area had travelled northward to the neighbourhood of Orissa. Reports from ships, subsequently received, showed that very rough weather had been experienced in the Bay, but the storm seems to have broken up without reaching the shore.

The pressure has been generally above the average throughout the month. The excess was considerable in parts of the peninsula, in Lower Bengal and Guzerat, but it decreased to the north-west, and at some stations in the Punjab was evanescent. Temperature was also generally above the average, except in Madras, at one or two stations in Bengal and Assam, and at Secunderabad, Ajmere, Simla, and Rawul Pindee. In Northern India, owing to the early cessation of the rains, October was a warm month, and the range between the day and night temperatures greater than usual. The relative humidity was, on the whole, below the average, except in the peninsula, Northern Bengal, and Assam. The winds have apparently been less regular than usual, and the low pressures which have prevailed over the Bay, in conjunction with the high pressures over the peninsula have caused dry north-westerly and westerly winds to prevail on the Carnatic coast instead of the normal moist northerly and north-north-easterly winds. Hitherto the November weather has been of a similar character, and the rainfall of the past fortnight, at several Carnatic stations (not at Madras itself) has been short of the average.

PROPOSED AGRICULTURAL OPERATIONS IN THE MADRAS PRESIDENCY.

Not long ago we alluded to the programme, published by the Government of Madras, which it was proposed to carry out in respect to agricultural operations in the Southern Presidency. In that it was stated that "our knowledge of Indian crops is too limited as yet for useful experiments." In another recently published G. O. on the subject of making experiments in diversifying the cropping of the irrigated area in the Presidency which is now almost solely devoted to paddy, we find the same Government stating that "there is no need to await more knowledge as to our Indian crops." We wonder what it all means. In the latter case, Mr. Benson seems to have been responsible for raising the point. The Director of Agriculture evidently hopes to acquire the knowledge by means of the experiments now proposed. The Board of Revenue state that it "can best be acquired by close study of actual conditions, if it is not found to be possessed by most middle-aged ryots and landholders." The Madras Government agree with the Director of Agriculture.

The Saidapet farm was closed because our knowledge of Indian crops is too limited for useful experiments. Now the Madras Government say, "it is unsatisfactory, after twenty years' experiments at Saidapet, to find the plea of want of knowledge put forward." Mr. Benson evidently wants more knowledge of our Indian crops. Without a clear definition of the description of information he wishes for, we are unable to say whether his plea is a good one, or whether the strictures passed thereon are justifiable. We are very well assured, however, from our knowledge of Mr. Benson's reports and book, "The Saidapet Farm Manual," that his knowledge of our Indian crops must be extensive. And was he not long since placed in charge of the Agricultural College at Madras? Would he have been placed in such a position, if his knowledge on this subject had not been the best obtainable, when Mr. Robertson was absent from India? The question then arises, what kind of knowledge can it be that Mr. Benson wants? As he said the other day, if it be practical knowledge of our crops, such as is to be obtained in the field, we consider the plea to be one meriting the censure of Government on those who put it forward. But we are inclined to believe that it must be a more intimate and exact knowledge than the longest and widest experience in the field can afford, which Mr. Benson asks for. In fact, we believe him to ask for, what we ourselves feel the want of, such knowledge as is only to be obtained by agricultural research, scientifically conducted. Such a study of the life-history and habits of our plants which can only be conducted in the laboratory and greenhouse, and which no amount of observation in the field can equal as affording a basis for sound and unassailable reasoning, or for the construction of healthy and vigorous, or the modification of empirical, systems of agriculture, when combined with a complete study of the two governing factors in all agricultural processes—soil and climate.

We must admit that as regards knowledge of the life-history, feeding-grounds, special forms of food affected by our common and industrial crops, we are in India lamentably deficient. We have, it is true, a certain amount of information on these points, as applied to plants generally, but they have never been studied under Indian conditions, nor with reference to Indian crops. No institution exists, nor has existed in India, organised for this special purpose; and even the best educated and trained of our agricultural officers can only apply, as far as possible, the general results of agricultural research in Europe to the crops and conditions with which they have to deal.

There is work for many agricultural chemists in India, and we wonder when the recommendations of the Conference, held in this city two years ago, are to be carried out. Partial and incomplete though they were, they at least would have given us some hope that some of the many great agricultural problems now before us in India, would have been placed in the way of settlement, had they been carried out. Without a basis of scientific research, no agricultural enquiry can be soundly started. No such research has been begun. No means are available for it. Well may the cry be, "We want knowledge." The Madras Government intended to have some experiments made to determine whether the water now used in raising rice cannot be economised; but say, that it is unnecessary first to determine "what is the least amount of water required to raise a remunerative crop of paddy." Unless the latter point is determined, we fail to see how it can be determined whether the experiments have proved an economy or not. That experiments to decide the point are necessary, and urgently necessary, no one with any knowledge of the manner in which water is used in rice cultivation can for a moment doubt. We therefore regret greatly the resolve of Government to allow an opportunity for carrying out experiments of such incalculable value and importance to the country to slip away.

To pass on: the Government do not think it to be necessary to provide any one to conduct and record the progress of the experiments, but would leave all this to private enterprise. This shows, either great faith in the enterprise and generosity of the ryots and landholders of Southern India, or great ignorance of the labor and time required to conduct and observe the progress of any agricultural experiments. We have no reason to suppose that, even in Madras, there are any number, if any, landholders able and willing to undertake such a laborious task. Even in wealthy England, there are few landlords—not simple landholders, be it said—who would face the trouble and expense of such a set of experiments as is sketched out by the Madras Government. If Madras can produce many such men, we must congratulate Mr. Robertson on the result of his labors. They have been successful far beyond any possible expectations he could have had.

IMPREGNATION OF TIMBER.—I.

The impregnation of timber is a matter of great importance in this country, and one to which the promoters of our Nilgiri-Rigi Railway will have to turn their earnest attention if they wish the sleepers of this much desired line to be permanent and durable. We will endeavour to give an exhaustive description of the best methods of impregnation.

Timber consists of fibre and sap. The former is an organic combination of carbon, hydrogen, and oxygen. The latter is a mixture of water and colouring matter, fats, ethereal oils, resins, tannin, gum, mucous, starch, sugar, organic and inorganic salts, and albuminous substances. Timber is liable to destruction by insects and by decomposition. The composition of the sap commences first, and the sap communicates the decomposition to the fibre. The fibre itself is, however, not free from the liability to decomposition. In damp air chemically pure fibre decomposes. When linen or cotton cloth is bleached, the colouring substances are just oxidised with a small amount of the fibre, which is the same fibre as that of wood. After the colouring matter has been destroyed, and nothing is left but the pure fibre, the latter commences to decompose, and unless the bleaching process were stopped, the cloth would be wholly ruined. Hemp fibre is nearly pure, and yet hempen ropes have to be protected against wet by means of tar. Thus it is clear from these examples that, even suppose the sap to have been removed or rendered harmless, the woody fibre itself if not protected, is still liable to decomposition, although of course in a much smaller degree than when *full of decomposing* sap. Damp with simultaneous access of air is most injurious to the wood as it promotes decomposition. Precautions are taken when felling timber that it should contain as little sap as possible. In Europe, timber is felled in winter, and the trees are allowed to lie for some time with the branches and leaves on them, so that the budding which takes place the following spring will exhaust the fluid remaining in the stem. For a similar purpose peeling off the bark of the living tree some time before felling has been recommended. After timber has been felled it has to be seasoned. During the seasoning process, some substances contained in the wood not only lose their water, but also in a great measure their hygroscopic property. If after once having been dried or seasoned the wood becomes wet again, it dries much sooner. Wood has also been seasoned by artificial heat. This process is sometimes very useful, but it requires care; otherwise the wood will crack and split. The seasoning by artificial heat has been adopted in connection with impregnation. Wood is not only mechanically injured, but actually decomposed at a temperature of 300°. If, after seasoning, the wood is protected from moisture, it will of course remain unaltered for a considerable time, and a superficial coating is all that is required to render it still less liable to decomposition. It is wood exposed to the open air and to all atmospheric changes which requires special protection, and for the sake of which the system of impregnation has been introduced. Railway sleepers are not only exposed to the rain and sun in succession, but they also have to lie on the ground from which they imbibe moisture. To protect them in some measure, care is taken that they are bedded in a good ballast, which allows the rain-water to drain off quickly and decrease the absorption of moisture from below. Coatings should, of course, only be applied to well seasoned wood, and it is unnecessary to explain that green or wet wood when coated over will not be able to dry and must therefore soon decay. A completely air-tight coating would preserve the wood for ever against any influence; but this is not possible. Wood has been boiled in tallow to give it an impervious coating; but it was a failure. Boiled coal-tar, free from ammonia, forms a very valuable protection to the wood. The coating of coal-tar can be repeated until the tar has penetrated the surface of the wood to the depth of half an inch. A very good substance for coating timber is also a solution of resin in linseed oil. Silicate of soda gives also a good protection. A mere surface coating of the wood is also a good external protection. It prevents decomposition commencing *from* the outside. In many cases superficial coatings are used with effect for keeping off white-ants. In Burmah, for instance, the timber of wooden structures is coated with petroleum as a protection against white-ants, but the process has to be repeated every year. The ends of wooden rafters have been dipped into coal-tar and the access of white-ants from the walls to the rafters has thereby been prevented. A coating composed of vegetable extract called "gutta gambier" with dammer oil and lime has been found effecttive against white-ants. Painting the wood with a solution of sulphate of copper has also been practiced. To protect wood which has to withstand wind and weather, something more than mere seasoning and coating is required. It must be altered constitutionally. This is done in two ways—by the removal of the sap, and by the addition to the wood of a new integral part in the shape of an antiseptic substance.

As the antiseptic substance as a rule is capable of combining with the albumen of the sap, thus rendering the latter harmless, the expulsion of the sap can in most cases be dispensed with. There is one method which will be specially explained hereafter, where the expulsion of the sap and the addition of the antiseptic substance take place simultaneously. Independently of this latter method, the sap may be expelled by various means. Wood will lose a great part of its sap by long continued soaking in stagnant, or still better, running water. Steaming is a quicker process, but not much resorted to, because the wood is found to deteriorate. Heating the wood by means of dry air is preferred to steaming. This does not remove the solid contents of the sap, but it renders them less dangerous, because the albumen is coagulated by the high temperature. Albumen coagulates at 167°. Antiseptic substances are also necessary for the *preservation of the fibre* even after the sap has been rendered harmless: because, as has been already explained, the fibre is in itself subject to decomposition, The following substances have been used or proposed for impregnation:—Creosote of commerce which is made from coal-tar, carbolic acid in an alkaline solution, raw-wood creosote, raw acetate of iron, sulphate of copper, chloride of zinc, sulphate of zinc, perchloride of mercury or corrosive sublimate, chloride of sodium or common salt, sulphate of soda, saltpetre, borax, sulphate of iron, and arsenic,

The creosote of commerce and the raw-wood creosote are oily substances and are used by themselves, whilst all the rest of the foregoing substances are used in aqueous solutions. The creosote of chemists is procured by the distillation of wood, and it is also contained in wood-smoke. A substance very similar to the genuine creosote is contained in coal-tar, and this latter substance in its pure state is the so-called carbolic acid. Genuine creosote is at ordinary temperatures a fluid, whilst carbolic acid is a solid. Carbolic acid exists as an article of commerce not only in a crystalline state of comparative purity, but also in a fluid state, being kept in solution by various tar oils. This fluid mixture of tar oils and carbolic acid is the creosote of commerce. It is not strictly correct to call it creosote, because the name of creosote was originally given to the antiseptic substance of the wood-tar only, but as the name is generally applied, it is not expedient to make an exception here. The simple term creosote is therefore used in referring to the product of coal-tar, whilst if the product obtained from wood-tar is spoken of, the expression "genuine creosote" or "wood creosote" is made use of. The two substances, wood creosote and carbolic acid, resemble each other so much, that for many years their identity has been maintained. There are, however, reactions which clearly mark them as different substances. While carbolic acid is solid at ordinary temperatures, wood creosote has only been obtained in a solid state at a temperature below freezing point. Further, the wood creosote has the characteristic smell of wood smoke, whilst carbolic acid has a different smell. Wood creosote boils at 397°, whilst carbolic acid boils at 369°. The density of both substances is slightly above that of water. Both are little soluble in water, but mix in all proportions with alcohol and ether. Both coagulate albumen readily, a fact which explains to some extent their preserving properties. Both combine readily with alkalies, and in the case of both substances this property is made use of in separating them from other more neutral oils of wood and *coal tars. Carbolic acid has also* been combined with alkali for the purpose of preparing an aqueous solution for the impregnation of wood. The dry distillation of wood yields, besides charcoal and gas, a heavy tar, and floating above the tar, an aqueous solution of acetic acid and of other substances. This solution used to be called raw pyroligneous acid. This acid, when purified, proves, however, to be identical with acetic acid. The raw acid contains much wood spirit and 1 per cent of creosote. The impure acid in combination with iron is used for the impregnation of wood. This is what is meant by the raw acetate of iron, enumerated amongst the antiseptic substances. The tar is distilled a second time, when oils, first lighter, then heavier than water, are separated from the pitch. The heavier oils represent the raw wood creosote. For chemical purposes pure wood creosote is prepared from his raw material by repeated distillations, combination of the wood creosote with alkali, redecomposition with sulphuric acid, &c. Coal yields, besides coke and gas, also a watery and an oily fluid. The former contains principally ammonia, the latter is subjected again to distillation. First more volatile oils are distilled, and with them benzine. At a temperature ranging between 150° and 200° the oils containing carbolic acid are distilled. The mixture of these latter oils and the carbolic acid constitutes the raw creosote of commerce. For the purpose of obtaining chemically pure carbolic acid, repeated distillations are carried on during which the carbolic acid is combined with lime and separated by muriatic acid, and then again combined with oxide of lead and set free by muriatic acid, &c. The dry distillation of wood yields products in something like the following proportions :—

Charcoal ...	... 25	per cent.
Wood-tar ..	... 7	,,
Water with Acetic Acid, &c.	.. 50	,,
Gas ...	... 12	,,
Loss ...	... 6	,,
Total	... 100	per cent.

Pines and firs being more resinous, yield up to 14 per cent of tar. Wood tar re-distilled yields half of its quantity in pitch and half in volatile substances. The volatile substances consist to a great extent of creosote. The quantity of raw creosote in the wood-tar is on an average equal to 3 per cent of the wood originally employed, and the quantity of pure wood creosote in the wood tar is on an average equal to at least 1 per cent of the wood originally employed. The raw acetic acid also contains 1 per cent of wood creosote. To make a solution of raw acetate of iron, old iron is thrown into the raw acetic acid, in which a sufficient quantity of the iron dissolves to neutralise all the acid. The solution of raw acetic acid is used for the impregnation of timber chiefly on account of the creosote it contains. Thus two kinds of materials for impregnation are obtained from the dry distillation of wood—(1) the oily substance with much creosote ; (2) the watery solution of acetate of iron with a small proportion of creosote. The latter material has not yet been generally approved of as a powerful antiseptic. During the manufacture of gas from coal, the following products are obtained :—

Coke ...	... 70	per cent.
Tar ...	... 6	,,
Ammoniacal liquid	... 6	,,
Gas ...	... 12	,,
Loss ...	... 6	,,
Total	... 100	per cent.

The specific gravity of coal-tar is 1·016. When re-distilled, it yields 25 per cent of volatile oils which can again be separated into lighter and heavier products. The former contain benzine, the latter contain carbolic acid, and they constitute the raw creosote of commerce. The quantity of pure carbolic acid contained in the whole of the tar is not less than 3 per cent. The quantity of carbolic acid in the creosote of commerce is sometimes very small indeed. For purposes of impregnation the proportion of carbolic acid ought to be less than 8 or 10 per cent. Creosote can be tested as to the proportion of carbolic acid it contains by a very simple process. The creosote is placed in a graduated glass tube. A solution of caustic alkali of a strength of 10 per cent is added, the whole well shaken, and afterwards allowed to settle. At the bottom unaltered alkali solution will be found ; above this a syrup-like combination of carbolic acid with the alkali, and last the undecomposed volatile oils. The diminution of volume which the volatile oils have suffered, indicates the quantity of carbolic acid. Peat and lignite yield similar products to those of wood and coal. Peat gives about 7 per cent of tar, and 40 per cent of ammoniacal water. Lignite gives about 7 per cent of tar, and 30 per cent of ammoniacal water. These tars contain large quantities of either creosote or carbolic acid. Oil from bituminous shales contains also a substance similar to, although not quite identical with, either wood creosote or carbolic acid. Creosote of commerce is the most important substance for the impregnation of wood. Not only is the carbolic acid which it contains a powerful antiseptic, but the tar oils also which keep the carbolic acid in solution are a most valuable protection of the woody fibre against damp. Creosote is also cheap and procurable in large quantities, so that it is well adapted for use on a large scale. Carbolic acid has been used in combination with alkalis in aqueous solution as a substance for impregnation. After the first impregnation with the carbolic acid salt, the wood has been saturated with a solution of sulphate of iron. This has the effect of causing free oxide of iron to be deposited in the pores of the wood, and of setting the carbolic acid free from the alkali. This material has the advantage that it can be used with water, but it is certainly a pity to lose the services of the tar oils, which accompany the carbolic acid in the creosote. The raw-wood creosote as an antiseptic for the preservation of wood is in no way inferior to the creosote of commerce. On the contrary, the raw-wood creosote contains much more really antiseptic substances than the creosote of commerce does. It is, however, very expensive and scarcely procurable in quantities large enough for purposes of impregnation. Raw acetate of iron can be used in aqueous solution, and this solution is able to take up a large proportion of wood creosote, which latter may thus be brought into the wood simultaneously with the iron salt. This substance is costly, and the results are questionable. The antiseptic qualities of sulphate of copper have been proved beyond a doubt, and it is very extensively used. There are instances where the impregnation of wood with sulphate of copper has failed. It is, however, unfair to ascribe all failures to the substance itself. Mineral salts when used as antiseptics have deficiencies from which creosote is free, but otherwise sulphate of copper is a good material. Sulphate of copper is used in solutions, with 1 to 2 per cent of the salt.

Miscellaneous Items.

CONSIDERABLE fiscal changes are taking place in Java. The import duties have been increased, and the export duties on sugar reduced by half, on coffee by two-thirds, and tea is made duty free.

MR. JEHANGHIR FRAMJEE LALLEE, Veterinary Surgeon, has been appointed to take charge of the Bai Sakarbai Dinshaw Petit Hospital for Animals, which was opened a few days ago, for the purpose of giving curative treatment to diseased working animals gratis. A fee of three annas per bullock per day and six annas per horse will be charged to cover the cost of feeding.

CAPTAIN DONNAN, the Superintendent of Pearl Fisheries in Ceylon, has recently visited Sillavatturai. His mission has been unsuccessful. He found all the oysters, in the experimental bank on the reef, dead, with the exception of a few which looked very seedy, and had not grown a bit since they were put into the bank in March last. Captain Donnan fully expected that pearl oysters would have lived and thriven in that bank as well as anywhere, and as they have not, he is very doubtful of the success of preserving them anywhere off their "natural beds."

ONE of the most noticeable features of the Sonepore Fair was Messrs. Jessop and Co.'s tent, in which were exhibited a number of agricultural implements and pumps. During the three great days of the fair, natives flocked in thousands to inspect this show, which appealed to their natural instincts as farmers, and displayed considerable interest in the numerous machines. Some of the wealthy zemindars made considerable purchases, and we are informed by Mr. Rainford, who represented Messrs. Jessop and Co., that orders were given for some 250 "Hindostan" ploughs. These admirable implements cannot fail to command an enormous sale when they become better known and appreciated by those interested in agriculture in this country. The testimony of those who have used them is entirely in their favour, and to this we can add our personal tribute of praise. We take this opportunity of warning the public against buying inferior ploughs of similar construction to the "Hindostan," which are now being offered for sale in certain districts, and which cannot fail to bring discredit on the genuine article.—*Indian Planters' Gazette*.

WE learn that, amongst the exhibits to be sent from Madras to the London Exhibition are several sketches in ink of archæological remains in the Presidency executed by the native draughtsmen attached to the Archæological Survey of Southern India. The drawings have been finished in a most elaborate manner, the lights and shades of the sculptured portions being so brought out in bold relief as to form a faithful delineation of the originals. It is considered that, whilst forming very good examples of art and archæology, they will at the same time afford people at home an opportunity of seeing for themselves to what excellence Indian draughtsmen of the present day can rise when under proper tuition and supervision.

LIEUTENANT GREELY, of the American Polar Expedition, delivered lately an address to an agricultural society at Pittsfield, in Massachusetts, in which he mentioned that during his Arctic exploration he had passed through a district in which there were numerous wild sheep having large heads, great horns like oxen, and tails resembling those of horses. Their fleece was of the finest and thickest wool, almost surpassing that of the merino. He observed that in New England there were often complaints of the difficulty of saving the lives of delicate beasts during a severe winter, and he was of opinion that it would be well worth while to make an experiment in acclimatization with those polar sheep, which thrive in a region where there is no shelter for them against the rigours of the Arctic winter.

GEOLOGICAL students will remember that last year much interest was caused by the announcement that human footprints had been discovered in the solid rock in a quarry over Lake Managua, in the territory of Nicaragua. The interest was increased by the statement that those footprints had been overlaid by 11 different layers of stone, extending to a depth of 4 metres. This seemed to indicate an antiquity for our race quite transcending all conjecture hitherto hazarded. An Austrian gentleman, Herr H. E Low, has obtained and forwarded to the Imperial Museum in Vienna, 12 large stone slabs bearing those footprints. They are about three-quarters of a metre square, and weigh altogether 35 centners. They can now be inspected by European geologists. The footprints are sunk into the stone to a depth of from 8 to 10 centimetres. The stone itself is a porous volcanic tufa, and the superincumbent layers, which had been removed for building purposes, were all of a more or less solid volcanic conglomerate. The footprints are very conspicuous, and seem to be those of three distinct persons, one of whom was a child. It is stated that in one of the overlaying strata, impressions of leaves were very numerous and conspicuous. Unfortunately, no specimens of this have been forwarded to Vienna. But it may be safely said that it would be rash to infer an extraordinary antiquity for those footprints from the fact that they have been covered over by several layers of stone to a considerable depth, which might have been deposited by a succession of volcanic eruptions.

Selections.

INTERNATIONAL EXHIBITION OF INDUSTRY, SCIENCE, AND ART TO BE HELD AT EDINBURGH IN 1886.

REGULATIONS FOR EXHIBITORS.

1. AN international Exhibition of Industry, Science, and Art, under the patronage of her Majesty the Queen, will be held in Edinburgh in 1886.

2. The Exhibition will be opened on 4th May, and will be closed on 30th October 1886.

3. Schedules of application for space may be had from the Secretary, Mr. James Marchbank, 29, Hanover street, Edinburgh. These must be filled up and returned on or before the 1st January 1886. The decision of the Space Committee will be notified as soon as possible after that date.

4. No goods will be received prior to 15th March 1886, without special permission, nor after 15th April 1886; but prior arrangements may be made for motors, boilers, or any exhibits requiring under-building.

5. The classification is not exhaustive. Where there does not appear to be any head under which an exhibit may be included, the exhibitors should apply for space, leaving the Executive Council to judge which group most nearly resembles the article he proposes to send.

6. Should any goods be delivered in the absence of the exhibitor, or his representative, the Executive Council will not be responsible for any loss or damage thereto arising from any cause whatever.

7. The Executive Council reserve the right to refuse any exhibit, without stating any reason for so doing.

8. Cases must be unpacked as soon as possible, and the empty cases removed from the ground at the expense and risk of the exhibitor; the Executive Council will endeavour to make arrangements for the storage of these at the expense of the exhibitor.

9. Charge will be made for space, except in special cases to be determined by the Executive Council. Exhibitors will have to pay all expenses of conveying, delivering, arranging, fixing, and removing their exhibits, and also the cost of the erection of all fixtures, screens, and counters when required; and they must personally, or by a representative, superintend the transmission, reception, unpacking, installation, and (at the close of the exhibition) the removal of their goods. The Executive Council reserve to themselves the right of doing whatever may be considered necessary at the expense of the exhibitor, unless this regulation is strictly complied with.

10. The Executive Council will endeavour to obtain, from the various railways and carriers, special terms for the conveyance to and from the exhibition: and should they succeed in doing so, such arrangements will be communicated to intending exhibitors.

11 All packages containing goods for Exhibition must have painted on them the distinctive mark (I E E) 1886 together with the name and address of the exhibitor.

Labels for this purpose will be supplied to each exhibitor.

12. Motive power (water, gas, and steam) will be supplied under certain conditions. Exhibitors requiring this must make special application to the Secretary, stating at what speed each machine is to be driven and power required. The furnishing of counter shafting will be at the expense of exhibitors All steam-boilers must be placed under efficient inspection, which will be arranged by the Executive Council at the expense of exhibitors.

13. Passes to the exhibition will be granted to exhibitors and to their attendants. If it is found that they are transferred, they will be immediately cancelled.

14. No explosives or any substances which, in the judgment of the Executive, are dangerous will be admitted, but they may be represented by models.

15. Spirits, oils, essences, corrosive substances, or anything likely to injure other articles or cause inconvenience to the public, must be placed in strong and suitable vessels of small size.

16. The Executive Council reserve to themselves the right of examining, or testing, any of the exhibits. If any damage or injury shall be occasioned during the exhibition by any exhibited machine, implement, or article, to any visitor or other person, then the exhibitor to whom such machinery, implement, or article may belong shall indemnify and hold harmless the said Council from and against all actions, suits, expenses, and claims on account or in respect of any such damage or injury which may be so caused.

17. While the Executive Council will not be responsible for loss or damage to any exhibit resulting from any cause whatsoever, they will nevertheless take every precaution for the care and preservation of the exhibits.

18. The Executive Council reserve the right to remove the exhibits of any one who does not conform to the regulations.

19. No article exhibited may be copied, photographed, drawn, or reproduced without the special permission of the exhibitor and of the Executive Council.

20. All cases, counters, platforms, screens, partitions must not (without special permission) exceed the following dimensions:—

Show cases and partitions ...	10 feet above the floor
Counters	2 feet 6 inches above the floor.
Platforms	1 foot above the floor.

21. Exhibitors may erect railings around their stands, and provide canopies, subject to approval: in every instance these railings must be within the area of the space allotted. In the case of machinery in motion, it is imperative that it be sufficiently *railed.*

22. Loan exhibits will be specially numbered and catalogued with the name of the sender. The Fine Art exhibits will be received under special regulations, which will be supplied on application to the Convener of the Sectional Committee.

23. The Artisan Exhibits will be specially numbered and catalogued with the name of the sender. These may be located in a distinct section, or otherwise, as the Executive Council may think proper.

24 The flooring must not be altered, removed, or strengthened except by sanction of the Executive Council.

25. No exhibitor will be permitted to display exhibits in such a manner as to obstruct the light, or impede the view along the open spaces, or to occasion inconvenience or injury to other exhibitors.

26. In order to ensure uniformity of decoration, no exhibitor will be allowed to put up flags, banners, or other kind of decoration without permission, and for covering counters, screens, or partitions, a material will be selected, which may be procured by exhibitors at the building.

27. Signs or name-boards must be placed to the satisfaction of the Space Committee, and must in no case interfere with the lighting. They must be black with gold letter.

28. All hand-bills, printed matter, &c., connected with exhibits, and intended for gratuitous distribution, must first receive the approval and permission of the Executive Council, which permission may be withdrawn at any time.

29. Exhibitors will be required to provide all necessary attendance to keep their stands and exhibits properly cleaned and in good order during the whole period of the Exhibition.

30. No exhibitor will be allowed to transfer any portion of the space allotted to him, or to allow any other than his own exhibits to be placed thereon.

31. All goods must be exhibited in the name of the individual or firm signing the application form.

32. Exhibitors will be permitted to mark the selling prices of the various articles exhibited for the information of the juries and visitors.

33. Exhibitors or their attendants may explain their exhibits to visitors, but they will not be allowed to press visitors to purchase the goods, the Exhibition being intended primarily for purposes of display.

34. Diplomas for gold, silver, and bronze medals and honorable mention will be awarded to exhibitors on the recommendation of juries, to whom power will be given to make an adequate number of awards, as follows, viz. :—

(1) Diplomas for Gold Medals.
(2) Do. Silver do.
(3) Do. Bronze do.
(4) Do. Honorable Mention.

35. No exhibit can be removed before the close of the Exhibition, without the special permission of the Executive Council. Exhibits not removed within fifteen days after the close of the Exhibition will be warehoused at the cost and risk of the owners, and whatever remains after three months will be sold by auction, and the proceeds applied to defray expenses.

36. All who become exhibitors signify by so doing their compliance with the whole of these regulations, together with such other regulations as the Executive Council may issue from time to time.

37. The Executive Council reserve to themselves the sole right of compiling and printing a catalogue of exhibits.

38. Any exhibitor having cause to complain regarding the conduct of any official or attendant must give notice in writing to the Executive Council.

39. The Executive Council reserve the right to order the removal of any attendant whose behaviour they consider unseemly.

40. The right to alter, amend, add to, or cancel any of these rules is reserved by the Executive Council.

Regulations Relative to "Old Edinburgh."

41. As this is regarded as a special feature of the Exhibition, parties applying for spaces must carefully indicate the corporation, guild, or craft they desire to represent.

42. In every instance the exhibitors will be required to arrange that their attendants shall wear the costumes of their respective periods and crafts Designs will be furnished by the Executive Council, or exhibitors may submit these for approval.

43. In no instance will an exhibitor be permitted to introduce more than one craft into the space allotted to him.

44. Special care will be required by the Executive Council in cases where fire or gas is used in any portion of these premises, and a responsible officer will be appointed to carry out the injunctions of the Committee in this respect.

Special Regulations Affecting Foreign Exhibits.

45. Applications for space from foreign countries will be received until 1st January 1886.

46. Applicants for space from foreign countries, where no Agent or Commissioner has been nominated, must appoint representatives to act on their behalf.

47. Agents or Commissioners must report to the Executive Committee the particulars of all exhibits proposed to be sent from their respective countries, and any proposed distribution of space allotted to these countries.

48. The letters IEE (in diamond) 1886 must be painted on all packages sent from abroad. The name of the country must also be put on, (along with a distinctive private mark, which must be intimated to the Secretary by post.

Classification.

Class I.

Minerals, Mining, Quarrying, and Metallurgy.

1. Coal.
2. Building and Paving Stones, Slate, Monumental Granite, &c.
3. Limestone and Cements.
4. Millstones and Whetstones.
5. Iron, Lead, Copper, & other Ores.
6. Pig Iron, Wrought iron, Steel—Process of Manufacture, &c.
7. Lead, Copper, Zinc, Tin, and Brass
8. Gold, Silver, Platinum, and other Metals.
9. Machinery and Apparatus of all descriptions used in Mining, Quarrying, and Metallurgy, or Models thereof.

} *In process of Manufacture or ready for use in the Arts.*

Class II.

Pottery, Glass, and kindred Industries.

1. Brick and Tiles (Plain and Decorative).
2. Earthenware and Stoneware.
3. Porcelain.
4. Glass of every description (Sheet, Plate, &c., Colored.)
5. Stained Glass for Architectural Purposes, &c.
6. Flint Glass or Crystal.
7. Bottle and Slag Glass.

Class III.

Chemistry, Pharmacy, and Food.

1. Acids—sulphuric, Nitric, Hydrochloric.
2. Alkalies—Soda, Potash, Magnesia, Lime Compounds.
3. Finer Chemicals, including Coal-Tar Colors.
4. Petroleum, Paraffin Oil, Paraffin Products.
5. Pharmaceutical Products.
6. Food (including Drinks).

Class IV.

Animal and Vegetable Substances and their Manufacture.

1. Gums, Resins, Gutta Percha, India-Rubber, Vegetable Oils.
2. Woods used in Construction.
3. Dyeing and Tanning Materials.
4. Textile Materials and Fabrics (Linen, Woollen, Jute, Cotton, Hemp), with Machinery employed for Spinning and Weaving. Sewing Machines, &c., in motion or otherwise.
5. Leather, Shoe-making, &c.
6. Costume.
7. Ladies' Work—Embroidery, Art Needle-work, &c.
8. Hat-making.

Class V.

Paper Manufacture, Stationery, Printing, and Book-binding.

1. Materials used, or which have been used, for Paper making.
2. Paper of all kinds—Wrapping, Writing, Drawing, Printing, Mounting-Boards, Mill-Boards, &c.
3. Papier-Mache.
4. Manufactured Stationery.
5. Type Printing.
6. Lithographing and Engraving, &c.
7. Book-binding.

Class VI.

Prime Movers.

1. Steam-Engines (Marine and Land), Gas, Electric, Hydraulic, Hot Air, &c. ; Water-Wheels, Turbines, Steam Pumps, &c.
2. Boilers, Smoke-Consuming Apparatus, &c.
3. Accessories of Engines or Boilers.

Class VII.

Manufactures in Metal.

1. Hardware, Edge-Tools, Cutlery, &c.
2. Military and Sporting Arms ; Weapons of various kinds.
3. Pewter, Britannia Metal, German Silver, and Nickel Wares.
4. Exhibits of Articles made of Brass, Copper, Lead, or Zinc, not coming under the Class Engineering and Architecture.
5. Gold and Silver Work and Jewellery.

Class VIII.

Railway, Tramway, and Vehicular Appliances.

1. Rails, Switches, Signalling Apparatus.
2. Locomotives, Goods Waggons, &c.
3. Tramway Cars, Rails, Permanent Way, &c.
4. Carriages, Vehicles, and Accessories, such as Brakes, Ticket-Checking Apparatus, &c.
5. Bicycles, Tricycles.

Class IX.

Civil and Military Engineering, Building, Construction, Ship-building.

1. Models and Details of Bridges, Docks, Lighthouses, &c.
2. Field Guns, Armour-Plate, Large Shot and Shell, &c.
3. Models of Buildings and Parts of Buildings.
4. Gates, Railings, Balconies, Beams, &c.
5. Sanitary Appliances.
6. Models of Ships, Ship Plates, Beams, &c.

Class X.

Furniture and Decoration.

1. Wood Furniture.
2. Marble Furniture.
3. Metal Furniture.
4. Basket Work—Bamboo, Willow, &c.
5. Furniture of Mixed Construction.
6. Paper-Hangings, Embossings, Linoleum and Floor Cloth, &c.
7. Painted Wall Decoration.
8. Stained Glass.
9. Fancy Articles for House Decoration.

Class XI.

Scientific Appliances.

Models of Special Apparatus for Illuminating (electrically or otherwise), Heating, or for Motor Power, for Domestic purposes, such as Oil, Gas, Hot-Air and Electric Engines ; Surgical, Medical, Mathematical, Meteorological, Astronomical, and Nautical or Military Adaptations of Scientific Inventions of novel application or design ; Clocks, Watches, &c., in progress of manufacture, &c. Photographs, Drawings, or Illustrations of quaint design of any Instrument or Apparatus of Antiquarian interest in this section may be exhibited.

Class XII.

Educational Appliances.

1 Models, &c., adapted for illustrating Technical and Scientific School Teaching, &c., ; Appliances and School Fittings with regard to utility and economy ; Museum and Microscopic Preparations for use in Secondary Schools ; Maps, Globes, Diagrams, Photographs, &c.

2. Music and Musical Instruments.

Class XIII.

Sea Industries.

1. Fishing Boats.
2. Fishing Apparatus (Nets, Lines, Hooks, &c.)
3. Fish Hatching Apparatus, &c.
   Fish Curing and Preserving.
5. Utilisation of Fish Oils, Sea-Weed, &c., including Isinglass, Kelp, Fish Glue, and Caviare, &c.

Class XIV.

Fine Arts.

1. Oil Paintings.
2. Water Colour Drawings.
3. Architectural Drawings.
4. Engravings, Etchings, and Lithographs.
5. Sculpture.
6. Photographs.

Class XV.

Reproductions of Old Buildings or Old Streets, or Portions of these.

Exhibits under this class will be accommodated in "Old Edinburgh," a Full-sized Model of Street, illustrating exact *fac similes* of Luckenbooths, West Port, Lawnmarket, West Bow, and other Old Historical Buildings of Fourteenth, Fifteenth, and Sixteenth Centuries.

Note.—In the buildings of this, which may be looked upon as a special feature of the Exhibition, the various Tradesmen desiring space therein will be located under the distinctive Corporation or Guild of the period pertaining to their Crafts, and the attendants should wear the costumes of their respective Periods and Crafts.

The Industries proposed to be represented in "Old Edinburgh" will embrace Typefounding, Printing, Engraving, Lithographing, and Photographing, Book-binding, Furniture, Carvings, House Decoration, Tapestry, Silver and Gold Plating, Jewellery, &c., or such other Handicrafts as the Committee may approve.

AGRICULTURAL DURBAR AT LUCKNOW.

[FROM AN OCCASIONAL CORRESPONDENT.]

LUCKNOW, December 7.

On the afternoon of Thursday, the 3rd December, the first "Agricultural Durbar" known in these provinces was held by the Lieutenant-Governor and Chief Commissioner at his Honor's camp, behind Government House. If the ceremony was not as prolonged and imposing as is sometimes the case in durbars, the occasion was one of peculiar interest—sufficiently so at all events to justify me in sketching briefly for readers of the *Pioneer* its origin and history.

It appears then that during the past year the head of the Agricultural Department in these provinces (*viz.*, the Director of Agriculture and Commerce) started the idea—a novel and at first sight somewhat problematic one of associating with him, in the preparation of reliable monthly forecasts of wheat and other export crops, a body of selected zemindars and talukdars, over four hundred in number, and hailing from all parts of the N.-W. P. and Oudh. Gradually the functions of these gentlemen were widened and extended. From being at the outset of the movement simply amateur crop reporters, they have become responsible referees in numerous important agricultural and economic questions; they have afforded much valuable assistance to the department to which they are, so to speak, affiliated; and they have been the means, unconsciously perhaps, but none the less successfully, of starting a mode of co-operation of the landed classes with the Agricultural Department the results of which are likely to prove extremely valuable. An attempt has been made in short to associate the people with the administration in the discussion and treatment of matters in which the people are themselves deeply and permanently interested.

The scheme thus started might or might not have borne much valuable fruit of itself, but it has undoubtedly received from the Agricultural Durbar, which was held by Sir Alfred Lyall on the 3rd of December, an impetus that practically ensures success. The Lieutenant-Governor was from the first interested in the matter; and it was at his express wish that the representatives of these volunteer agents of the Director of Agriculture and Commerce were invited to meet his Honor in public durbar—to be thanked for their labours in the past, encouraged to pursue them zealously in the future, and formed (along with the collaborateurs whom they represented) into an Agricultural Association of a practical and working kind, to which the Government might confidently look for information, advice, and assistance.

It was accordingly arranged that some sixty of the principal men (that is, those who had most interested themselves in the movement) should be invited by the Director—first, to be present at the opening of the Lucknow Exhibition, and, second, to have the honor of meeting the Lieutenant-Governor and Chief Commissioner in public durbar on December 3rd. By half-past 1 o'clock on the afternoon in question the zemindars and talukdars were seated in the order of their position or rank in the durbar tent, and from that time till his Honor's appearance at 3 o'clock they were engaged, under the presidency of the Director and his assistants, in discussing the following topics:—

I.—Measures for initiating those connected with the land, both landlords and tenants, in such improved methods of tillage and agricultural management as might from time to time be established by successful experiments at the Cawnpore farm.

II.—Measures for popularising the use of such agricultural implements, as similar experiments to those mentioned above had proved to be really useful improvements on the implements in common use.

III.—Measures for supplying cultivators with the best and purest seed for such valuable export crops as wheat, cotton, linseed, &c.

IV.—Measures for the organisation of an Agricultural Association for the United Provinces, with certain definite duties and responsibilities.

These subjects were discussed freely by all present. The principal speakers, as the records (access to which was courteously permitted us) show, were: for the N.-W. P., the Raja of Haldour (Bijnor), Syed Mihrban Ali (Bulandshuhur), Mahomed Yusaf Ali Khan (Aligurh), Chowdhri Debi Singh (Meerut), Mahomed Ali Khan (Bulundshuhur), and Mahabir Prasad Singh (Allahabad); and for Oudh, the Raja of Bhinga, Raja Jagmohun Singh, and Thakur Bhisunath Baksh Singh, all talukdars of position and influence. Pandit Ajadhya Pershad (Shahjehanpore), who has been appointed honorary Assistant Director, recorded the minutes and took a prominent part in the discussion.

Precisely at 3 o'clock the Lieutenant-Governor was received, at the entrance of the durbar tent, by Mr. Donald Smeaton, Director of Agriculture and Commerce, and Colonel Pitcher, Deputy Director, and Mir Mahomed Hussain, Assistant Director, and conducted to the chair of state. His Honor was accompanied by his personal staff, and the following gentlemen among others were in attendance: Mr. Lawrence (Commissioner of Allahabad), Mr. Rivett Carnac, (Opium Agent), Mr. Mulock (Judge of Shahjehanpore), Mr. R. Smeaton (Financial Secretary). With the Lieutenant-Governor's permission, the Director proceeded to present the gentlemen one by one to his Honor, who touched and remitted the *nuzzers* which were offered, according to the old custom prevalent on such occasions. This ceremonial part of the business being over, Sir Alfred Lyall addressed the assembly in the vernacular. He thanked them cordially for the work which they had done, and pointed out the great advantage of accurate and punctual forecasts of the chief export crops in the interests of the commercial world, both in London and in India and of agriculture in these provinces. He regarded it as of great importance that the Government should be able to depend, with some confidence, on the landed classes for aid in obtaining really trustworthy information on agricultural matters, and hoped that the gentlemen present, and those whom they represented, would continue the voluntary labours which they had so well begun. His Honor alluded to the great need of developing to the utmost extent possible the agricultural resources of the United Provinces, and of endeavouring by every means to increase produce and cheapen production, and concluded by expressing a hope that at the next durbar of this kind which he proposed holding in the following year, there would be some substantial progress to be reported.

At Mr. Smeaton's request, Pandit Ajodhya Pershad, honorary Assistant Director, then briefly announced to his Honor the conclusions arrived at on the four topics which had that day been discussed. Regarding the first, it had been agreed that the landed proprietors of the N.-W. P. and Oudh should from time to time depute selected cultivators either to the experimental station at Cawnpore or to the "demonstration" farms at Meerut and elsewhere for the purpose of being made practically acquainted with such measures and processes as had been proved to be advantageous and suitable, so as to be in a position on their return home to initiate their fellow-cultivators in those matters. It had further been resolved that an attempt should be made to start the teaching of elementary agricultural principles in village schools.

On the second topic it had been agreed that the plan lately adopted by the Director of sending out trained apprentices with the new ploughs on tour during the ploughing season (and with other implements at other times) in selected districts, should be extended, and that measures should be taken with this object in the ensuing autumn with the view of letting cultivators see the new plough at work side by side with the country plough in their fields, and of judging for themselves of the superiority of the former over the latter in agricultural work. The gentlemen present had further willingly promised to do all in their power to spread among their their people a sound practical knowledge of the working of these new implements, and of the advantages to be derived from their use. On the third point it had been decided that the present system should meanwhile be continued : the Government, through the Director of Agriculture and Commerce, selecting and distributing to all who desired it, the best class of seed procurable. It was admitted that this plan had worked very satisfactorily—in fact, the demand for the selected seed had far exceeded the supply owing to sudden and unforeseen requisitions from persons who had not at first contemplated applying. On the fourth and last point, the meeting had been unable to arrive at a complete agreement, and desired to reserve further discussion till the following day, when the gentlemen present were to meet in committee. But the general feeling was very strongly in favour of the immediate organisation of an *Agricultural Association* with branches for both Provinces, and perhaps sub-branches for some of the larger divisions.

Raja Jag Mohan Singh, on behalf of Oudh and the Raja of Haldour on the part of the N.-W. P., then advanced to the front, and thanked the Lieutenant-Governor for kindly consenting to meet them in durbar, assuring him of their genuine earnestness in co-operating with the Director and his staff, and promising that no pains would be spared by them in rendering this co-operation productive of real benefit to the agricultural classes and interests in the provinces.

This closed the interesting proceedings, and the durbar was formally dismissed. The movement could not possibly have had a more auspicious commencement. It is noteworthy that the zemindars and talukdars who form the (inchoate) Association have already rendered valuable aid to the Agricultural Bureau by their early and accurate statistics regarding the chief export crops. The durbar to which they were invited marked, therefore, an epoch of good work actually done, not the mere opening of an Association from which results were to be hoped. As such, the occasion was both an interesting and important one, well meriting this brief notice of its proceedings in the columns of the *Pioneer*.—*Pioneer*.

SILAGE STACKING.

We have received from Mr. James Hunt, of Brentry Farm. Westbury-on-Trym, near Bristol, a copy of his pamphlet on the above subject ; and as silos and ensilage are just now very much before the public, have been the subject of investigation by a Parliamentary Commission, and those who take an interest in the matter have formed themselves into an Ensilage Society, we deem it advisable to bring the points thus published before the notice of our readers. The great drawback hitherto to ordinary farmers adopting the system as part of their farm practice—or even trying it as an experiment—is the initial and heavy expense incurred in the erection of silos, even of those on the simplest and cheapest plan.

Mr. Hunt proposes to do away with silos altogether, and simply build up the green grass as as ordinary hay stack anywhere, but in the corner of the field where it grew by preference, so as to save excessive carting as much as possible There is, of course, nothing novel about the mere stacking of silage—as that has been tried again and again—but it is in the application of the pressure that Mr. Hunt claims supremacy. Next to erecting a silo, the applicatian of the pressure has been a great bugbear. Pressure by weights may now be said to be superseded by mechanical arrangements of some kind, and the author claims to have invented a cheap and efficient means of pressing ordinary stacks.

Briefly, the method is as follows :—Rough beams of wood, iron rails, or anything of that kind, are laid down at intervals apart on the site of the proposed stack ; the stack is then built up like an ordinary haystack—sloping roof and all ; poles or bars of any kind are laid lengthways along the top ; chains are then fastened to the ends of the poles underneath, and passed over the top : and by attaching a particular kind of lever, on the end of which there is an arrangement of sliding bars of iron, with holes at regular intervals and self-acting spring hooks, the ends of the chains can be levered down link by link, as easily as a man will press a bale of hay in a handbaling machine. The ends of the chains can then be made fast, and the lever detached to be used on the next set.

Mr. Hunt has not been long in finding out that a great drawback to stacking silage in the open was the loss from the sides going mouldy, and he states he was the first to discover that common salt could counteract this, as also a composition, of which he does not give the ingredients. We, however, differ very decidedly as to the quantity of salt to be employed. Mr. Hunt states that about 2 lbs. per cwt. should be applied. Now, as an animal of the cattle kind only requires some 4oz. daily, it is plain that in consuming 56 lbs of ensilage a beast will take in four times as much salt as it requires. This fact was first pointed out some four years ago in our columns by Professor Wallace. We would advise that this large quantity be applied to the outside layers only, where it will do most good. In feeding, this portion can be mixed with the rest.

In short, Mr Hunt offers the gears and levers necessary to press a stack of 60 tons (but not including the chains) for £3-15s. and brings evidence to show that salt will keep the outsides good. Sweet silage can be quite well made on Mr. Fry's system, by simply building the stack up piece by piece, and allowing the heat to rise above 120 degs. before putting on pressure. The relative cost of hay and silage making have been often worked out, but as many people believe that silage will take the place of roots and not of hay, the fact that five times more weight has to be carted home than is the case with hay, will not deter farmers from trying it. We have no hesitation in saying that stacking silage has been wonderfully successful in the past, and promises to be completely so in the future, and will therefore commend itself to farmers more and more. We recommend a perusal of this pamphlet to all concerned in ensilage.—*North British Agriculturist.*

OUR MINERAL WEALTH.

Few persons who have not had their attention specially called to the subject have any conception of the vastness of our mineral wealth, nor the amount it annually contributes to the sum total of the products of the country. Its contributions may be classed as metals, coal, petroleum, building stone, brick, and other products of clay, lime, cement, prosphates, salt, natural gas, and chemical substances used in the arts. From the report of the geological survey for 1884, just published, we condense the following facts and figures, showing the value of the output from all these sources in 1884 :—

The total value of coal mined was, of anthracite, $65,351,512, of bituminous and all other coals, $77,417,066, a total of $143,768,578. The product of Neproloam amounted to 24,039,758 barrels of 42 gallons each, which, at an average price of 85 cents per barrel, was worth $20,476,294 The estimated value of natural gas used wat $1,460,000. The total value of iron and steel in the first stages of manufacture amounted to $107,000,009. Of precious metals, the product of gold from the mines was $30,800,000, and of silver, $15,800,000, a total of $79 600,000. Our total copper product, at an average price of 12½ cents per pound, amounted to $17,789,687. Lead footed up $10,537,042, and zinc $3,422,708 Quicksilver amounted to $936,327. The total estimated value of building stone quarried during the year was $19,000,000, and of brick and tile made, $30,000,000 Lime figures at $18,500,000, and cement at $210 000. The South Carolina phosphate rock quarried during the year is placed at $2,374,784. Salt figures at $4,197,734, and bromine, borax, alum, copperas and mineral waters together make a total of $2,935,554, making a grand total of $462,208,704 This is a large amount to add substantially (as the most of it is added) to the wealth of the country from the bowels of the earth. But when it is taken into account that a very large percentage of this total value represents wages paid to laborers, it gives an added significance to the subject, affording as it does employment and support to a vast labouring population dependent upon the farmer for the food they eat and upon the manufacturing and mercantile interests for the supply of their other wants. It is safe to assume that fully three-fourths of the above grand total represents labour in some form. This is equivalent to a sum of $346,656,528. Allowing an average of $2·00 per day paid for labor for 300 days in the year this sum represents the employment of 57,776 labourers, and taking into account the families dependent upon them it represents the support of a population of not less than 200,000 persons. But these values as above stated represents only the values of these products in their crude state ; as they enter into manufacture, or are moved to market they furnish employment to a still larger army of workers, by whose labour their value is greatly augmented. Taking into account our facilities for production from the farm, our wealth in mines and forests, our natural and artificial means of transportation, and our widely diversified industries, this country should have little to complain of if we make a wise use of natural advantages.—*Farmers' Review.*

DON'T DIE IN THE HOUSE.

"Rough on Rats" clears out rats, mice, beetles, roaches, bed-bugs, flies, ants, insects, moles, chipmunks, gophers.

A. W. Mason & Co., Calcutta, Sole Agents.

THE ENSILAGE PROCESS.

THE *Times* says the evidence taken by the Private Ensilage Commission and the preliminary report based upon it have put beyond all doubt the value of the ensilage process as an auxiliary to farm practice. The commissioners were willing to give a hearing to all witnesses, to the opponents of ensilage no less than its friends and advocates But in whatever quarter they applied, they heard no expression of any decidedly unfavourable views. The ideal silo, as describ d by one of the scientific witnesses, is simply a closed chamber from which atmospheric air is excluded, the air space within it being filled with some neutral such as carbonic acid gas. This admits of being realised with more or less approach to perfection in a great variety of ways. There is no definition of the material from which the walls of the silo are to be made, and we find accordingly all sorts of material employed. Bricks, stones, slabs or clay, iron, wood, sometimes coated internally with cement, sometimes uncoated—there were advocates for every one of them. Then as to the food contents of the silo, there was nothing excluded which cattle could be induced to eat, and a good deal put in which was not fit to be eaten until it had been subjected to the process of fermentation which went on inside the silo. The stalks of maize are naturally an indigestible food, but they improve under fermentation. The chief thing necessary with almost all green food in order to insure good results seems to be that it shall be cut before it is fully ripe. Grass must be cut before it seeds; maize before the ears are developed, and before the stalk is fully hardened. The mixed mass of green stuff from which the ensilage is to come is found to shrink in bulk very considerably. The general method is to put it in by degrees, and to tread or press down each day's addition so as to fill the silo to the top and to reduce the shrinkage to a minimum. The result aimed at is simple enough. The mode of attaining it, as described to the Commissioners, was different in almost every instance. Various forms of elaborate machinery for compression were in favour with some of the witnesses. Others were content with putting earth or bricks at the top of the silo. One ingenious person used old petroleum casks filled with water up to the point which gave them the desired weight. Closely connected with this part of the subject is the roofing of the silo, and here again comes a fresh sub-division of method. That the silo must be made thoroughly air-tight was allowed on all hands. That it must be well filled was the opinion of every witness but one, who was satisfied with having his silo air-tight, since it was only by the intrusion of atmospheric air that any harm could come to the contents. On the question of cost there was a marked difference between one method and another as on most other points. One form of silo was shown to be capable of construction at 7s. 6d. per ton of inside space. For another form the cost rose to 30s. In many instances it was found impossible to give an estimate of cost. Sometimes no distinct account had been kept. Frequently, too, some old material had been taken as it stood and put to new use as a silo. The whole system is clearly in the experimental stage. The adverse claims of efficiency and economy have not yet been reconciled. Some of the witnesses, indeed, who went to work on the least expensive plan, declared themselves satisfied that it was as good as any other, and that no advantage could be gained, worth speaking of, by any increase of cost. On the cheapest of all the methods of producing ensilage—that of stacking the fodder and doing without a silo in any form—the commissioners have not been able to pronounce favourably as yet. The system has been tried on Lord Crawford's estate, and a practical witness considers the results as equivalent to so much dung. Mr. R. J. Wilberforce has made an unintended experiment in the same direction, and one which he has no wish to repeat. He was trying to stack hay green, and to dry it by an exhaust-fan. This he so entirely failed to do that he gave up the stack as so much waste stuff. But when he came to cut it down he found the outside waste to a depth of about three feet, the next layer fairly good food, and the centre sweet ensilage On the advantages of the ensilage system the variations of opinion are in degrees rather than in kind We may claim for it, as admitted, that it gives the means of supplying cattle with green food of excellent quality at all times of the year, and that in a climate like our own it enables food to be preserved with certainty, which would be liable to be wasted otherwise. The ensilage system has been so lately introduced into this country, that there has been no time as yet for its practitioners to come to an agreement about it. It has established itself so firmly, and has gained ground so rapidly, as to prove its value in the opinion of those who have given it a trial, or who have been witnesses of their neighbours' success and have begun to experiment for themselves.—*North British Agriculturist.*

PROFESSOR SHELDON ON DAIRY FARMING.

ADDRESSING a large assemblage at the Working Dairy in connection with the recent Dairy Show in London, Professor Sheldon referred to the origin, present position, and prospects of the British Dairy Association. He stated that until the present year, the association had not progressed very satisfactorily, but this year the number of members had largely increased, and he believed that they would be able to accomplish that which they desired in respect to dairy education. Although the holding of shows was an important feature, that was not the chief object of the association, which was to improve the dairy husbandry of the country. The shows were supposed to express the highest attainment to which they could get, and there were to be found both butter and cheese, the very best of their kind. Their object was not to get together a large quantity of those things—which, no doubt, was very useful for supplying data from which to draw comparisons—but to provide examples for imitation. The shows were intended to be, and were regarded as, the results of work done. The association desired to educate persons in dairy processes of husbandry in all the different branches. The present condition of dairy husbandry was very unsatisfactory. The depression throughout England in all the arable districts had at last overtaken dairy farming, and it was to the credit of dairy farming that it had held out so long. Having been the last to succumb to the depression, he believed it had sufficient vitality to be one of the first industries to recover therefrom. There were in this year's show some most magnificent samples of cheese, the show being the very best of those he had attended in the building. The exhibits of both butter and cheese this week were the best he had seen at this association's shows. It was his opinion that they ought to establish a number of dairy schools, for there was a great want of them in England. In Ireland such schools had been founded by private munificence, and there were now several in the south of that country. An important one was that known as the Munster Dairy School, near the town of Cork. The effect of that upon the butter-making of Ireland had been very marked indeed. He had it upon the highest authority that the result of the training at that school had been to raise the average value of butter in that part of Ireland from something like 1d. to 2d. per lb. A result like that was certainly worth striving for; and if such a result could be achieved in a few years, what might not be obtained after the institution had been working for twenty or thirty years? He had acted in many instances as a judge of dairy produce, especially as to the qualities of butter, and it afforded him the greatest pleasure to bear his testimony to the marked skill which dairymaids had displayed in the art of butter-making. He had never seen in any part of the country a higher degree of skill displayed by any butter-makers than that which was displayed by the Irish girls at this show. But he was glad to say that Miss Holmes, of the Surdridge Farm at Bromley, who was at the present show, had taken part in nearly every one of the competitions at Dublin. In England, schools were required not only for butter-making, but for cheese-making. There was great disparity shown in the quality of both cheese and butter in this country from milk presumably of about the same quality. There were found very varying degrees in both butter and cheese. At the Nantwich Cheese Factory cheese was produced which sold from 20s. to 68s. per cwt., and a disparity like that was absurd. What could be looked for in cheese which was sold for not more than 20s. per cwt.? The difference between that sum and 68s. made all the difference between ruin and prosperity. It seemed to him to be a pitiful thing that at the end of the nineteenth century their dairy education should have advanced so slowly, and should be so imperfect as to admit of such a disparity as 20s. to 68s. per cwt. for cheese. He noticed also, with regard to the butter markets in Ireland, last week the price ranged from 60s. to 115s. per cwt.—a difference of close upon 100 per cent. In reply to one of the assembly, who asked the cause of that great difference, the Professor said that it was chiefly due to the want of method. Greater pains should be taken to improve the products from the milk of the cow. It was a matter of pain to him personally (having been engaged in dairy education for many years) to notice what a marked disparity there was in the quality of cheese and butter. The milk was just about the same everywhere, and any variation in butter or cheese made from it should not be in the quality but in the quantity produced. It should be tolerably uniform in quality. He felt convinced that there was a great future for dairy farming in this country. Whilst corn-growing was doomed in England, the consumption of fresh milk was increasing. It had trebled within the last twenty years in London, but still it was even now at a low ebb. Both cheese and butter ought to be consumed in much greater quantities, for there was no article of food so cheap as cheese. There was room for a great extension in the consumption of those commodities, and he hoped that that increase would be facilitated by the law enforcing the sale of pure milk and restricting the sale of artificial butter and prohibiting its being sold as genuine butter—(a voice, 'That's Protection'). No; it was prevention of adulteration. The persons who sold artificial butter as such under its proper designation were doing that which was right and proper, and beneficial to the poor; but when they tried to sell it as genuine butter they were attempting a fraud upon the public, and the public should be protected.

A gentleman amongst the audience said that in his county (Lancashire) butter was produced at soap factories, so he thought that more protection was needed.

Professor Sheldon agreed that the public needed protection in that matter, for there was no law which at present dealt sufficiently with butter adulteration. The adulteration laws were not sufficiently effective, and the dairy farmers had a just claim to to be protected against a spurious article being sold as butter. Butterine he did not object to in the least, but let it be made and sold as such. After some further general remarks about the show, the Professor concluded his interesting address.—*North British Agriculturist.*

HOLLOWAY'S OINTMENT AND PILLS.—Old Sores, Wounds, and Ulcers.—The readiness with which Holloway's unguent removes all obstructions in the circulation of the vessels and lymphatics explains their irresistible influence in healing old sores, bad wounds, and indolent ulcers. To insure the desired effect the skin surrounding the diseased part should be fomented, dried, and immediately well rubbed with the Ointment. This will give purity to the foul blood, and strength to the weakened nerves, the only conditions necessary for the cure of all those ulcerations, which render life almost intolerable No sooner is this Ointment's protective powers exerted than the destructive process ceases, and the constructive business begins—new, healthy growth appears to fill up the lately painful excavated pit.

AN ALARMING DISEASE AFFLICTING A NUMEROUS CLASS.

THE disease commences with a slight derangement of the stomach, but if neglected, it in time involves the whole frame, embracing the kidneys, liver, pancreas, and in fact the entire glandular system ; and the afflicted drags out a miserable existence until death gives relief from suffering. The disease is often mistaken for other complaints ; but if the reader will ask himself the following questions, he will be able to determine whether he himself is one of the afflicted :—Have I distress, pain, or difficulty in breathing after eating ? Is there a dull, heavy feeling, attended by drowsiness ? Have the eyes a yellow tinge ? Does thick sticky mucous gather about the gums and teeth in the mornings, accompanied by a disagreeable taste ? Is the tongue coated ? Are there pains in the sides and back ? Is there a fullness about the right side as if the liver were enlarging ? Is there costiveness ? Is there vertigo or dizziness when rising suddenly from a horizontal position ? Are the secretions from the kidneys scanty and highly coloured, with a deposit after standing ? Does food ferment soon after eating, accompanied by flatulence or a belching of gas from the stomach ? Is there frequent palpitation of the heart ? These various symptoms may not be present at one time, but they torment the sufferer in turn as the dreadful disease progresses. If the case be one of long standing, there will be a dry hacking cough, attended after a time by expectoration. In very advanced stages the skin assumes a dirty, brownish appearance, and the hands and feet are covered by a cold sticky perspiration. As the liver and kidneys become more and more diseased, rheumatic pains appear, and the usual treatment proves entirely unavailing against this latter agonising disorder. The origin of this malady is indigestion or dyspepsia, and a small quantity of the proper medicine will remove the disease if taken in its incipiency. It is most important that the disease should be promptly and properly treated in its first stages, when a little medicine will effect a cure, and even when it has obtained a strong hold, the correct remedy should be persevered in until every vestige of the disease is eradicated, until the appetite has returned, and the digestive organs are restored to a healthy condition. The surest and most effectual remedy for this distressing complaint is "Seigel's Curative Syrup," a vegetable preparation, sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White, Limited, 17, Farringdon-road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

Market-Place, Pocklington, York, Oct. 2, 1882.

Sir,—Being a sufferer for years with dyspepsia in all its worst forms, and after spending pounds in medicines, I was at last persuaded to try Mother Seigel's Curative Syrup, and am thankful to say have derived more benefit from it than any other medicine I ever took, and would advise any one suffering from the same complaint to give it a trial ; the results they would soon find out for themselves. If you like to make any use of this testimonial you are quite at liberty to do so.—Yours respectfully,

(Signed) R. TURNER.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

St. Mary-street, Peterborough, Nov. 29, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia ; but after a few doses of the Syrup, I found relief, and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,

Mr. A. J. WHITE. WILLIAM BRENT.

Hensingham, Whitehaven, Oct. 16, 1882.

Mr. A. J. WHITE.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial which I did. I am now happy to state that it has restored me to complete health.—I remain, yours respectfully,

(Signed) JOHN H. LIGHTFOOT.

August 15th, 1883.

Dear Sir,—I write to tell you that Mr. Henry Hillier, of Yatesbury, Wilts, informs me that he suffered from a severe form of indigestion for upwards of four years, and took no end of doctor's medicine without the slightest benefit, and declares Mother Seigel's Syrup which he got from me has saved his life.—Yours truly,

(Signed) N. WEBB,
Chemist, Calne.

Mr. WHITE.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. All who have tried it speak very highly of its medicinal virtues; one customer describes it as a "Godsend to dyspeptic people." I always recommend it with confidence.—Faithfully yours,

(Signed) VINCENT A. WILLS,
Chemist-Dentist,
Merthyr Tydvil.

To Mr. A. J. WHITE.

Preston, Sept. 21st, 1883.

My Dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said, "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully ; in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.—I am, dear Sir, yours faithfully,

(Signed) W. BOWKER.

To A. J. WHITE, Esq. (A)

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VOL. X.] CALCUTTA :—SATURDAY, DECEMBER 19, 1885. [No. 51

Health, Crop and Weather Report.

[FOR THE WEEK ENDING 9TH DECEMBER 1885.]

Madras.—General prospects fair ; continue favourable in Bellary and Anantapore.

Bombay.—River falling in Sind. More rain wanted for *rabi* crops in parts of Nasik, Ahmednugger, Sholapore, and Khandesh. Standing crops suffering from drought in one taluka of Nasik and parts of Ahmednugger and from blight in parts of Bijapore. Reaping of *kharif* and sowing of *rabi* crops in progress in parts of seven districts. Cholera in parts of seven, fever in parts of sixteen, cattle-disease in parts of ten, and small-pox in parts of three districts.

Bengal.—No rain during the week. Rice harvest is proceeding, and is generally yielding a good outturn. *Rabi* crops everywhere, and poppy in Behar and Hazareebagh, are promising, but want rain in parts of Behar. Price of rice remained stationary in almost all districts during the week. Public health continues generally fair.

N.-W. P. and Oudh.—Weather turning colder. Rain is needed in some districts for the *rabi*. Markets are well supplied and prices fairly steady. Public health is generally good.

Punjab.—No rain ; it is much wanted. Cholera in parts of the Dera Ismail Khan district, elsewhere health is generally good. *Rabi* sowings nearly completed. Prices show a rising tendency.

Central Provinces.—Weather rather cloudy and less cold. *Kharif* harvest progressing ; *rabi* sowings almost finished. Prospects favourable Fever and cattle-disease in places. Prices steady.

British Burmah (*December 2nd*).—Slight cholera in eight districts, elsewhere public health good ; cattle disease severe in one district, slight in five districts, elsewhere health of cattle good. Crop prospects good in all districts, except in Tharrawaddy and Prome, where the rain-fall has not been sufficient. There has been heavy rain over the whole province and a violent gale on the seaboard ; the extent of damage which the rain and the gale may have done to the crops is not yet known. (*December 9th*).—Slight cholera in seven districts, elsewhere public health good ; slight cattle-disease in six districts, elsewhere health of cattle good. Crop prospects good in all districts except in Thayetmyo, where the crops are poor, and in Prome and Tharrawady, where they are fair.

Assam.—Weather seasonable. Public health fair. *Kalajar* seems still prevalent in parts of the Luki tahsil. Prospects of all crops good. Reaping of *sali* being continued. Cattle-disease again reported from some mouzahs. A few cases of cholera reported from Sunamgunj. Common rice 16 seers per rupee ; tea season nearly closed.

Mysore and Coorg.—Public health generally good, except in parts where fever prevails ; cattle-disease in parts of Shimogra, Kolar, and Kadur. Standing crops in good condition ; crops sown late need rain ; harvesting of *ragi* and of paddy in progress. Prices fluctuating.

Berar and Hyderabad.—Weather clear and cool. Cotton picking continues ; *kharif* being cut, *rabi* prospects good. Wheat 22 and *jowari* 26 [illegible] per rupee in Amraoti ; *rabi* crops prospering. Fever continues to pre[illegible] Prices—white rice 14½, coarse rice 12½, white *juar* 20½, yellow juar 27, and *tur* 15½ seers per current sicca rupee in Hyderabad.

Central India States.—Price of wheat risen in Indore, stationary elsewhere. Health and prospects good. Weather seasonable ; cholera still in Rewah. *Rabi* doing well ; opium prospects good.

Rajpootana.—General health good, but fever to some extent still prevails. Weather clear and colder. Winter crops nearly all sown. Tanks and wells full everywhere except in Pertabghur and Meywar. *Kharif* crop being gathered and the *rabi* thriving. Small-pox slightly prevalent in Meywar. Opium sowings commenced in Harowti. Prices stationary in some places and fluctuating in others. Cattle-disease prevalent in two tehsils.

Editorial Notes.

WE learn that the Bombay cotton crop is proving an unusually early one, about 16,000 bales having already reached the market. The crop is expected to be one of the best, both in quantity and quality, ever known on the Bombay side of India. Estimates of the next six months' shipments range from one to one-and-a-quarter million bales.

⁂

THE first report of the Royal Commission on Trade has been issued, and shows that considerable depression has existed for the last five years as compared with the previous five years, but there is a marked difference of opinion as to possible remedies. The Birmingham Chamber of Commerce attributes the depression in part to German and Belgian competition, to foreign import duties on home-manufactured goods exported abroad, and to the exorbitant railway rates.

⁂

AMONG our selections this week will be found two very interesting papers—one on dairy farming on the continent, and the other on parasites affecting animals. The importance of the latter will be appreciated by agriculturists and farmers in this country, where very little attention is paid to a subject so vitally affecting meat consumers. Mr. Connochie has dealt very ably with the matter in hand, and we hope our professors in veterinary and agricultural colleges will take an opportunity of initiating the delivery of lectures of a similar character to the students entrusted to their care.

⁂

WE understand that a scheme for establishing an agricultural farm in connection with the Bombay Eurasian and Anglo-Indian Association has been drawn up and ordered to be circulated to the members of the council. A new branch of the Association has been formed at Dharwar. The newspaper proposed to be started as the organ of the Association, in the same way that the *Eastern Guardian* is the organ of the Madras Eurasian and Anglo-Indian Association, is proposed to be called the *Anglo-Indian Mail.*

⁂

THE latest published list of tea gardens or tea estates in Ceylon shows that there are at present 583 gardens, either bearing or under cultivation. But what strikes us as curious, when compared with the size and extent of Indian tea estates and gardens, is the small areas covered by most of the gardens individually. We notice that there is only one which covers 500 acres, while the greater number of the others do not exceed 100 acres in extent. This is of course not surprising when the area of the whole island is compared with the tea-growing districts of India.

⁂

Kuhlow's Trade Journal, in noticing the subject of tobacco cultivation in Germany, says :—

Official returns show that this year 19,579·2 hectares of land were cultivated with tobacco within the jurisdiction of the German customs authorities, against 21,090·6 hect. last year, a decrease of 1,511·4 hect. The falling-off applies almost entirely to Bavaria, Baden, Wurtemberg, Hesse, and Alsace-Lorraine, while there is an increase in the land thus cultivated in Pomerania, Brandenburg, Hanover, the province of Saxony, and Silesia. In the Kingdom of Prussia 661·5 hect. more are being cultivated with tobacco than in 1884.

BORING for petroleum in the Bolan, says a contemporary, may now be considered as past the experimental stage. The Canadian experts engaged, who have hitherto been cautious in expressing their opinion, are now confident that sufficient oil can be raised, not only to supply fuel for the railways near, but also for the lighting of all northern India. Some of the engines of the Pishin Railway are being altered so as to burn petroleum instead of wood; and the new fuel will, no doubt, in time be universal on that and the present Indus Valley line. Refining works, for the manufacture of lighting and lubricating oil, will follow; and in the course of a few years, American kerosine should be unknown in our bazaars.

⁂

TIMBER rot is looked upon as something which must be expected; but after a perusal of our paper on the "Impregnation of Timber," we hope our readers will have found something wherewith to keep off the dreaded rot. In this connection, the *Builder* says that nine-tenths of the decay of timber is due to rot occasioned by the common wood fungus. This parasite develops under two conditions, namely, moisture and heat, and both are present in new green or unseasoned timber employed in buildings. In old or seasoned timber, the former is wanting, and hence greater durability. If moisture only is present without heat, the fungus will not grow; if heat without moisture, it equally has no scope for development, and hence the protecting influence of ventilation.

⁂

WE learn from a home contemporary that the esparto grass trade in Tunis is now carried on there on a large scale, and large tracts of esparto-producing fields have been bought by speculators. The Anglo-French Esparto Fibre Company are developing their trade at Abouhedma, and a tramway is now being laid down by the same to carry the esparto fibre to the coast. But export duty is very heavy on this article, and competition by Tripoli and Algeria, where esparto pays no export duty, is telling much on the trade. *This trade is said to be* amongst the very foremost resources of the Lousa district. "Through good and bad, dry or rainy years, there is always a crop of it. The Arabs fall back on it chiefly in times of scarcity, when successive years have brought them deficient crops. But the duty on this article, especially at Lousa, is so heavy as to deter the Arabs from pulling and bringing it to the market, except when they feel the pinch of poverty."

⁂

THE Collector of the Nilgherries the other day submitted for orders the question, whether lands under coffee held on putta should be exempted from assessment for more than two years, as it had been the practice to exempt such lands for the first three years in other districts. At the same time, he took occasion to ask also whether it is the intention of Government that coffee land alone, and not tea, cinchona, &c., should be treated with indulgence. With regard to the first question, it has been decided not to take any further action as to what has been done in the past; but that no sufficient reason exists for departing from the rule laid down in 1860, so far as the future is concerned. As to the second point, it seems that when this question was raised, in connection with lands taken up under the Waste Land Rules, the Government directed that the concession made to tea lands should apply to such special products as coffee and cinchona, and not to tea only, and to grass land as well as forest. Therefore, reasoning from analogy, it has been decided that the indulgence extends to other special products also, and is not confined to coffee.

⁂

THE report on the state of the season and prospects of the crops, for the week ending 9th December 1885 is as follows :—

Heavy rain has fallen in British Burmah and slight rain in parts of the Madras Presidency, Mysore, and Coorg. Elsewhere the week has been rainless. Agricultural prospects continue fair in the Madras Presidency, though in one or two places some injury has been caused by insect, and in parts of Coimbatore more rain would be beneficial. In Mysore the standing crops are in good condition, but those sown late need rain. The *ragi* and paddy harvests are in progress. In Coorg the season promises well. In the Bombay Presidency *kharif* crops are still being harvested and *rabi* sown. In parts of Nasik, Ahmednugger, Sholapore, and Nasik, more rain is wanted for the latter. In the Berars, Hyderabad, and Central India and Rajpootana, the cutting of the *kharif* crops is in progress, and the *rabi* crops promise well. The *rabi* sowings have been almost completed in the Central Provinces and in the Punjab. In the latter province rain is much wanted in several districts. In the North-Western Provinces and Oudh the *rabi* crops are coming up well, but more rain is wanted in the districts of Allahabad, Banda, Kumaon, and Jhansi. The rice harvest in Bengal is yielding a good outturn, and the *rabi* crops promise well. In Assam the state and prospects of the crops continue favourable. In British Burmah crop prospects are generally good in all districts except in Thayetmyo. The public health is fair in all provinces. Prices are generally steady everywhere except in the Punjab and Coorg where they show a tendency to rise, and in Mysore where they are fluctuating.

⁂

AN entomological lecture was delivered the other evening at the Indian Club by a Mr. P. Mowis, a foreigner, who has been devoting some of his leisure moments to the collection of butterflies, and especially those species which produce the silk-worm. The lecturer expounded some of the mysteries of the butterfly and insect creation, illustrating his experiences in the Himalaya and other regions in India, where he underwent the utmost privation in his researches into entomology. He exhibited fifty cases of butterflies, beetles, and other insects. He explained the different varieties of butterflies, their properties, and their natural uses, stating that his collection was chiefly from Darjeeling. The beetles, he added, were collected from Sikhim, and excelled in a great measure those obtained from Brazil. In describing the production of silk by silkworms, he asserted that to manufacture 18 yards of silk, no less than 10,000 silk worms would have to be absorbed, and the time taken would be a twelve-month. He then showed the process by which the silk was manufactured from cocoons. On the subject of caterpillars he stated that there were five large families, and each caterpillar could consume ten times its own weight in a day. The cocoons he said were known to be eaten by the natives, who implicitly rely upon their efficacy for the prevention of fever. In the same way moths were eaten by natives as a specific for fever, and for other disorders It was only recently that the marvellous faculty of providing silks for the covering of moth's eggs for protection was discovered. The silk was found in the pocket of a moth's wing. The lecture concluded with a general illustration of the utility of insect life in connection with human industries.

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THE following summary of the German home trade for the week ending 18th November 1885, is taken from *Kuhlow's* :—

The state of trade is about the same as last week : no appreciable change has set in during the last seven days, The good time is no doubt coming, but it is very long about it. After the prolonged period of ever-deepening depression which we have experienced, it is, however, a source of consolation that matters are not getting worse. The *Iron* trade continues very dull, especially the pig iron branch, the production of which, however, has not materially fallen off. Less is being produced in the rolled iron department, and little fear is entertained of any serious glut resulting. The *coal* market is satisfactorily situated, as it has now been for some weeks, nor is there any reason to suppose that a reaction will speedily set in. [illegible] the iron and coal industries of Westphalia have of late been cheered by the prospect of the long-talked-of North Baltic Sea Canal being taken in hand with a determination to carry it through. Of course, such a gigantic work will require a long time for its completion, but the advantage of connecting the North and Baltic Seas by a ship canal, would undoubtedly be very considerable for the industries of the westernmost parts of the Empire. The *Sugar* market has been stronger during the week, though no great change in the situation can be reported. The offers of raw sugar have only been moderate—corresponding, in fact, to the requirements of refiners—so that the prices of high-polarising qualities were well maintained. A better business has been done in export sugar, and in consequence of hopeful reports from abroad a small advance of prices was secured. The tendency of the refined sugar market has been quiet. The unsatisfactory relation between the prices of raw and refined sugar, gives rise to the expectation that [illegible] improvement will soon take place in regard to the latter, as a stronger demand is confidently relied on.

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THE *Corn* market is still dull. Wheat is flat, both native and Russian, and barley is the same, while little different can be said of rye. *Wool* sales have been confined within narrow limits, present necessities alone being covered, while prices are the same as before. *Cotton* has experienced a better trade during the week. The *Yarn* market is, generally speaking, dull, but there are exceptions. Soft worsted yarns are in good demand, and carded stuffs are better situated. On the whole the spinning industry is only fairly busy. Rough carded yarns go badly at present, but loop yarns are as taking as ever, though how long the fashion will continue is a difficult point to speculate upon. Manufacturers would perhaps do well not to build too many hopes on loops. The business in *Silk* goods has been improved by the low prices. In the *Leather* industry foreign trade has been good, but provincial buyers still continue reserved and only purchase what is really necessary. Favourable reports from producing countries have given a stimulus to the *Tobacco* market, and in some kinds the business has been considerably better. A further decline in prices has characterised the *Spirit* market. In most branches of industry a feeling of uncertainty has been caused by the declaration of war between Servia and Bulgaria, for it is not possible to say to what developments the untoward incident may lead.

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DR. E. BONAVIA of Etawah has been endeavouring to arouse public attention to the value of lemon and lime juice in the treatment of malarious and other fevers. It is interesting to note that this mode of treatment for malarious fever has also attracted a great deal of attention in America, for we find the following remarks on this subject in a recent issue of the *N. Y News* :—

The newest remedy for malaria is advertised in the drug stores as the Roman cure. It is described as the discovery of a physician in the miasmatic old city of the Cæsars and the Pontiffs, where malaria is included with every lodging without extra charge in the bill. It consists simply of lemons cut up, peel and all, and boiled, the juice being taken cold on an empty stomach. The pharmacists claim that it has cured cases so stubborn, that quinine had no more effect on them than sugar or salt. The method of preparation is so simple that any one can make an experiment who chooses. The lemon must be cut up in small pieces, rind and pulp, each good-sized lemon being allowed a pint of water. When the water has boiled down to half a pint the medicine is done. It must then be strained through a cloth and put by to cool. It is sour enough to give a marble bust a wry face. The dose is from a teaspoonful to a table spoonful according to the staying powers of the patient's stomach, taken one hour before meals. Like the hot-water cure, wonderful stories are commencing to float around about the lemon cure, and it bids fair to become very popular. A physician who is a member of, and has many patients in, the New York Athletic Club, informed the *News* reporter that he had been giving concentrated lemon in malaria cases for nearly a year, and now scarcely ever uses quinine. The new remedy does all the work of quinine without affecting the nerves or the head as quinine certainly does.

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WE offered some remarks a short time back on the effects of tea-drinking. The following practical hints by *Wong Chin Foo* (whoever he may be) in the *Cook*, should be read in connection with our paper :—

Use a China or porcelain pot. If you do use metal, let it be tin new, bright and clean; never use it when the tin is worn out and the iron is exposed. If you do, you are playing chemist and forming tannate or tea-ate of iron. Use black tea. Green tea, when good, is kept at home. What goes abroad is bad, very bad and horrible. Besides containing the 203 adulterations the Chinese philanthropist puts up for the outside barbarian, it is always pervaded by copper dust from the dirty curing pans of the growers. Infuse your tea. Don't boil it. Place one teaspoonful of tea in the pot and pour over it one and a half cups of boiling water—that is, water really boiling. If your tea is poor, use more. It is cheaper though to buy good tea at the outset. Put your pot on the back part of the stove, carefully covered, so that it shall not lose its heat and the tea its bouquet. Let it remain there five minutes; then drink it. Drink your tea plain Don't add milk nor sugar. Tea brokers and tea-tasters never do; epicures never do; the Chinese never do. Milk contains fibrin, albumen or some other such stuff, and the tea a delicate amount of tannin. Mixing the two makes the liquid turbid. This turbidity, if I remember the encyclopædia aright, is tannate of fibrin, or leather. People who put milk in tea are, therefore, drinking boots and shoes in mild disguise.

A CORRESPONDENT of the *Gardeners' Chronicle* writes as follows on the manurial value of freshly fallen leaves :—

Our knowledge regarding the manurial value of fallen leaves has recently been added to by Professor Emmerling and others, in a communication contributed to the current number of the *Bied. Centr.*, 1885. The results are given in the following tables :—

PERCENTAGE COMPOSITION.

	Grey Poplar (Populus canescens).	White Willow (Salix alba).	Silver Poplar (Populus argentea).	Silver Birch (Betula alba).	Sycamore (Ac Pseudo-Platan	Common Ald (Alnus glutinos	Oak (Quercus r bur)	Beech (Fagus S vatica).	Hornbeam (Car nus betulus).
Water.. ..	20·88	20·27	18·31	15·73	17·74	17·06	17·73	15·35	17·03
Dry matter .	79·12	79·73	81·69	84·27	82·26	82·94	82·27	84·65	82·97
In dry matter :—									
Albuminoids .	11·52	16·74	12·51	5·05	6·39	18·71	7·07	6·57	7·57
Fat	6·09	5·15	8·42	13·58	6·30	5·91	5·73	3·66	3·86
Carbo hydrates ..	48·41	51·38	51·00	60·70	52·10	54·24	52·57	55·49	60·31
Fibre . ..	26·14	19·72	20·46	20·10	28·31	17·74	30·68	29·82	24·83
Mineral matter (ash) ..	7·51	7·01	7·55	2·57	6·81	3·40	3·95	4·46	3·43
Nitrogen in dry matter .	1·84	2·68	2·00	0·81	1·03	2·99	1·13	1·05	1·21

PRINCIPAL CONSTITUENTS IN THE ASH—PER CENT.

Potash	14·79	21·60	20·31	12·77	14·30	7·37	12·02	10·05	10·96
Soda	7·04	7·61	1·14	4·41	2·56	2·17	3·95	5·41	8·37
Lime	24·69	27·19	20·57	31·75	30·80	48·03	27·48	22·12	22·84
Magnesia ..	9·39	6·78	7·39	24·54	6·35	10·70	8·35	6·24	10·65
Phosphoric acid .	4·97	7·56	5·37	5·18	2·44	5·53	4·08	4·72	5·84
Sulphuric acid ..	5·07	13·37	6·46	3·81	3·10	5·70	3·43	3·65	4·31
Silica .. .	23·96	5·40	21·74	5·37	22·05	10·08	22·97	32·98	18·76

A glance at these figures will show the immense variation in the constituents, and *consequently in the manurial value*, of different plant leaves, but it must be remembered that a few analyses of plants or their separate organs do not suffice to decide what kind and what amount of plant food a crop needs, and still less in what combination they produce the best effect; they simply tell what kind and amount the plant under examination contains at that particular moment. It is a well established fact that the same variety of plants, whether raised upon different kinds of soil or upon the same soils of a varying degree of richness, may contain a widely differing absolute amount of the same kind of organic "volatile" and inorganic "fixed" constituents. It appears that about 3,000lb. of perfectly dry pine timber are produced with a consumption of only 2½lb. of potash and 1lb. of phosphoric acid per acre per annum; with beech trees the quantities required are rather larger. The growth of trees and shrubs, therefore, is plainly less exhaustive to the soil than ordinary garden culture. The demand on the soil becomes, moreover, considerably greater, if all the fallen leaves are removed.

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DALMATIA has been regarded as one of the first countries in Europe where the culture of silk became general. It has the advantage of a wonderfully fine climate, and its vegetable products were at one time held in high esteem. Even now it is remarkable for some of its fruit exports. The British Consul at Ragusa, in reporting upon the agriculture of the place, says that the country is well adapted for the rearing of the silkworm and the cultivation of the mulberry. The secret of the production of silk by means of the silkworm was, it is said, long jealously guarded by the Chinese, but was at length disclosed to the Emperor Justinian through the treacherous proceedings of a Princess of China who, on leaving China to marry the Khan of Khotan, managed by the aid of her bridal robes to deceive the vigilance of the guards on the frontier, and for the first time carried the eggs of the silkworm out of the country, and so gave her husband a surprising nuptial gift. About the year 552, by means of missionary monks in Central Asia, Justinian managed to procure a supply of eggs, and in the reign of his son the manufacture of silk in Europe became established.

Under the protection of the Byzantine Emperors, Dalmatia was one of the first countries in which the culture of silk became general, and there can be little doubt that the sacerdotal garment, called the Dalmatic, owes its name to its having been originally fabricated in silk. The cultivation of the silkworm has, however, been gradually diminishing in Dalmatia, and is still diminishing. One of the chief articles of export of Ragusa in ancient times was dried figs to Venice, and the fig tree is still much cultivated, and the dried fig of Dalmatia is of a very fine quality. The cultivation of the fig has, however, much fallen off since the flourshing period of the provinces. The same may be said of the almond, which also flourishes well. The most esteemed kinds have a tender shell, which can be broken easily with the fingers, and large quantities are exported to other parts of Austria. Both oranges and lemons thrive in the southern parts of Dalmatia, but their cultivation is much neglected. The carob tree is also abundant, and grows wild. Little or no attention is given to the cultivation of garden produce; all vegetables grow pretty much as they will. Asparagus grows wild in abundance in the mountains, but none is grown in the gardens. Lettuce also grows abundantly, but is of inferior quality, for a supply of which Ragusa, with a superior climate, is sometimes dependent on Trieste. The national vegetable is the "kupus," a species of cabbage, which only requires planting once in three years, and requires no attention. The reputation of the flowers of the chrysanthemum cinerariaefolium as an insecticide has suffered on account of defective kinds, and the adulterations of it, which have found their way into the market; however, when well selected and prepared, there is no doubt of its efficacy, and it is especially valuable for the protection it affords to costly furs and stuffs against the attacks of moth. The best quality comes from the island of Tesina; the plant is said to thrive better in some localities than in others, and to lose its insecticidal powers out of Dalmatia, where it is indigenous. Another plant which thrives particularly well in Dalmatia is the sumac, which is much used in tanning leather.

IMPREGNATION OF TIMBER.—II.

Chloride of zinc is a good antiseptic for the impregnation of wood. It is, however, not quite so good as sulphate of copper, but it is cheap and on that account not less important than the copper salt. The impregnation with chloride of zinc offers the advantage that the wood does not become hard and can be dressed after the impregnation. Wood impregnated with chloride of zinc will also take coatings of oil paint. Sulphate of zinc would no doubt be as efficacious as chloride of zinc, but it is not employed owing to its being more expensive than chloride of zinc. The per-chloride of mercury or corrosive sublimate has the disadvantage of being extremely poisonous and very costly. Its antiseptic qualities are indisputable. It is used for the preservation of specimens of natural history, pictures, &c. It coagulates albumen most readily. Common salt is well known to have the property of preserving organic substances from decomposition. It has been found that timber in salt mines keeps remarkably well. When salt is employed it must be used in sufficient quantities to prevent its being washed away. Salt is a very good preservative in damp places. When used in too small quantities salt will only have the effect of attracting moisture without protecting the wood. Its application to railway sleepers is rare, though it has been repeatedly recommended for impregnating purposes. Sulphate of iron has been tried in some cases, but is no longer used, other metallic salts having been proved to be superior. Sulphate of iron has the effect of hardening wood. Saltpetre, borax, and arsenic have all more or less antiseptic qualities. A kind of petrification of wood has been produced by a successive impregnation with two different solutions; these solutions being so chosen that they will form a precipitate when mixed. This precipitate remains as an insoluble, in fact, stony, substance, and as it were petrifies the wood. At first sight it would appear that this process might add to the durability of wood, but in actual practice it resulted in nothing, and has been entirely abandoned. The stony particles massed in the minute cavities of the wood have no chemical action on the woody fibre, nor can they protect it from moisture. The damp enters the wood almost as freely as if foreign bodies were not present, because these foreign bodies can only partially fill the cavities. The combinations of solutions which have been tried are, alum and alkali, silicate of potash and sulphuric acid, chloride of barium and carbonate of soda, chloride of calcium and sulphate of soda, tin or copper salts and alkali, sulphate of iron and carbonate of soda. Having enumerated the antiseptic substances with which wood is impregnated, it remains to describe the various processes by which the impregnation is performed. They are:—First, the impregnation of wood with vaporous substances; second, the impregnation with fluids. The impregnation of wood with vaporous substances, if practicable, would have very great advantages over the impregnation by fluids. The expediency of making experiments on a large scale with vapour of an antiseptic substance appears therefore exceedingly desirable, and in its own interests and those of the public, Government might direct the Forest Department to take the matter in hand. A patent was taken out in 1855 for impregnating wood by exposing it in a closed chamber to the vapour of creosote. Success is also claimed for a similar process with the vapour of tar. The natural process of impregnation is that with smoke. Wood smoke, containing creosote, when acting a long time on wood, renders the latter exceedingly durable. Open wood fires in huts preserve the timber and straw of the roofs, and are known to preserve from decay even new hay and corn when stored in an insufficiently dry state. A difficulty appears to lie in the high temperature at which carbolic acid boils, *viz.* 369°. Genuine wood creosote requires even as much as 397°. Wood itself commences to decompose when subjected to a temperature higher than 300°. The creosote must therefore be largely mixed with other vapours and gases to render it volatile at a temperature which is not injurious to the wood. Four different processes are made use of for impregnating wood with liquids:—

1. Spontaneous ascent of the antiseptic fluid in the stem of the living tree, sometimes aided by pressure.

2. Replacement of the sap in felled stems by the antiseptic fluids under hydraulic pressure.

3. Soaking of the wood in the cold or boiling antiseptic fluid.

4. The pneumatic process. Exhaustion of the air from the wood in a boiler, and application of high pressure to force the fluid into the wood.

1. The spontaneous ascent of the antiseptic fluid in the stem of a living tree is brought about in the following way. A hole is bored into the stem at the base, and through a tube which is connected with a cask full of antiseptic fluid, the latter is allowed to flow into the hole. The tree at once commences to drink up the fluid. The constant evaporation of water by the leaves causes under ordinary circumstances the rising of water from the roots up into the stem and branches. The antiseptic fluid being, however, offered much more readily than the water supplied by the roots, and as a precaution some of the roots being cut through, the antiseptic fluid alone rises in the stem and spreads during fair weather within twenty-four hours over the whole tree, which, being thus impregnated with sulphate of copper or chloride of zinc, dies in a few days. A similar process is also used with raw pyrolignite (acetate) of iron or copper, common salt, white arsenic, and a solution of resin in oil of turpentine or alcohol. A drawback is the necessity of impregnating the whole tree, and the waste of antiseptic fluid arising therefrom. This is not of much account in view of so cheap a material as chloride of zinc. A more serious obstacle is the difficulty of floating the timber after impregnation.

2. Replacement of the sap in felled stems by the antiseptic fluid under hydraulic pressure.—Newly felled logs are laid horizontally, and one end is fitted up in such a way that the antiseptic fluid can be brought to bear upon the wood under a hydraulic pressure of a column of water thirty feet high. The stems have the bark on them, and the fluid enters the stem and flows towards the other end. As soon as the antiseptic fluid commences to enter at one end the sap of the tree exudes at the other end, and is gradually expelled, the antiseptic fluid taking its place. Moderate sized

trees yield several tons of expelled sap. At first the issuing fluid is pure sap, but after some time a mixture of sap and antiseptic fluid takes place in the interior of the stem, and the two fluids issue together. By continuing the admission of antiseptic fluid the sap is made more and more to disappear, and the result is considered satisfactory when the first fluid which issues from the tree, contains only one-third in sap and two-thirds of antiseptic fluid. The antiseptic substance exclusively used in this process is sulphate of copper. It is employed in a weak solution containing one per cent of salt. Success in this system very much depends upon the kind of wood. The process answers very well with beech; it also does with pine, but is entirely unsuitable to oak; the antiseptic fluid cannot pass through the hard old wood of the oak. Instead of laying the stems horizontally, they may also be placed upright, and the fluid made to enter from above. No oily substance like creosote can be used with this process.

3. The mere soaking of the wood, although very convenient, is of course as a rule a most imperfect process; still there are cases where soaking is resorted to with some success. Some sleepers were immersed in tar for a period of not less than sixty days, and yet they showed scarcely any penetration. Chloride of zinc in solution has been applied to wood by means of soaking, but it was found necessary to adopt a more perfect process. The timber must be immersed two days for every inch in thickness and left to dry after soaking for about twenty days. Heating the fluid lends further aid to impregnation. Thus, wood was artificially dried, and whilst hot, immersed in hot creosote, when it absorbed as much as 9lbs. of creosote per cubic foot. In another instance, sleepers were immersed for four hours in creosote raised to a temperature of 150°, and the impregnation proved fairly satisfactory for such a cheap method. It may be expected that mere soaking succeeds best when the quantity of antiseptic substance is limited. This is the case when perchloride of mercury or corrosive sublimate is used. Corrosive sublimate is very dear, and impregnation is generally effected by soaking sleepers in a solution of it from one to ten days. The solution contains one per cent of the salt or less, and only half an ounce of salt is expended on one cubic foot of impregnated wood.

4. The pneumatic process of impregnation.—This is the most perfect process, and gives satisfaction when others fail. The ordinary requirements of a pneumatic impregnating apparatus are: (1) Two cylindrical boilers of six feet diameter capable of withstanding the pressure of the atmosphere during the evacuation of the air in them, and also of an interior pressure produced by a hydraulic pump worked up to 150lbs. per square inch. (2) An air pump to exhaust the air from the boilers. (3) A water pump. (4) An hydraulic force pump to supply the boilers with fluid up to a pressure of 150lbs. per square inch. (5) An engine of about 10 horse-power to work the pump. (6) Reservoirs for the antiseptic fluid, &c. (7) Tramways to bring the wood on waggons to and from the boilers: the waggons being of such shape that they can be run into the boilers, which are provided with rails and large top pieces for the purpose. There is nothing particular about these requirements which can all be obtained without difficulty. The boilers differ in nothing but their top pieces from the ordinary steam boilers and the air and water pumps are the same as those manufactured for other purposes. Any engine will do, or a water wheel, if there should be sufficient water power available. The tramway, reservoirs, &c., may be constructed as most convenient in each case, so no description of them is necessary. In the pneumatic process the wood is brought to the apparatus in its finished state, it is packed on the waggons and with them pushed into the impregnation boiler and then the lid is closed and made air tight. If steaming is to take place it is done now before further operations. Steaming of course is only suitable when aqueous solutions are used for impregnation, and when the wood is not already well seasoned; it would never do to steam the wood before the impregnation with oily creosote. The creosote and the oils would fix the water in the wood. If creosote is the substance with which the wood is to be impregnated, the wood may with advantage be subjected to artificial dry heat. After the steaming up to 150° the liquid must be drawn off which has collected at the bottom of the boiler. When all fluid has left the boiler, the exhaustion of the air by means of the air pump is commenced. The minimum of pressure is reached after half-an-hour's pumping, but the work has to be continued as the wood does not give up its air all at once. After the exhaustion of the air the impregnating fluid is admitted. Creosote is often used in a warm state of 100 to 120 degrees temperature so as to render it more liquid. Whilst the fluid is forced in by superior pressure of the atmosphere, the air-pump must still continue playing, otherwise the rarified air in the boiler would, by being limited to a smaller and gradually decreasing space, become denser and fill the uppermost pieces of timber, rendering them incapable of receiving the impregnating fluid like the other timbers. Care must be taken to avoid overfilling the boiler, because otherwise the antiseptic fluid would get into the air pump. When the boiler is very nearly full, the access of the fluid is stopped, and the compression of the antiseptic fluid in the boiler commences. The force pump drives more and more fluid into the boiler until a pressure of 120lbs. sometimes of 150 pounds per square inch is reached. This pressure is kept up for a time, varying from two to sixteen hours, during which time the wood constantly imbibes fluid. The process is finished up by running the fluid off, opening the head piece of the boiler and taking the waggons out. We commend this enterprise to the attention of the indefatigable firm of Messrs. Groves & Co. Their Ashley works are admirably situated and adapted for the industry which, in time, would develop colossal proportions, and under their able management we are confident the scheme would prove an unqualified success.

The completeness of the impregnation under the foregoing system depends upon the length of time during which the pressure is maintained. As a rule the time allowed for the various operations is such, that the boilers can be filled twice every working day. The pneumatic process is adopted both for creosote and for metallic salts. Sulphate of copper, it must be remembered, cannot be brought into an iron boiler. Factories where the former is used must be provided with costly copper boilers. When creosote is the antiseptic substance employed, the amount taken up by pine and other soft woods is ten to twelve pounds per cubic foot. This amount is considered to be sufficient, and even a smaller quantity of creosote would answer in many cases. Hard woods take up much less creosote. Oak, for instance, takes up only two or three pounds of the oil, even under the heaviest pressure possible. Indian sal wood was penetrated only to one-eighth of an inch from the surface during one particular trial. Sap wood is easier penetrated than old wood in which the circulation of the sap had ceased prior to the felling of the tree. There need be no hesitation as regards the use of impregnated sap wood. If well impregnated it is often found superior to heartwood which has taken up an insufficient quantity of creosote. Examples of woods admitting easy and perfect impregnation are maple, alder, beech, plane, birch, lime. Not quite so easy are pine, fir, larch, poplar, elm. The oak and acacia are scarcely suited for impregnation. The following experiments demonstrate what amount of creosote the harder woods of this country were found to take up:—

	Pounds of creosote per cubic foot
Sissu	3¾
Sundri	2¼
Teak	1¾
Sal	1
Ironwood	1
Mahogany	0¾
Jaman	0¾

Experiments with aqueous solutions of chloride of zinc confirm the results obtained from creosote, the hard wood taking up much less than the soft wood. The following shows the quantity of solution of chloride of zinc taken up under the pneumatic treatment by different kinds of wood:—

1 cubic foot of pine wood	16 lbs. solution.
1 do. „ beech „	18 „ „
1 do. „ oak „	8 „ „

The small capability of some hard woods to take up antiseptic fluids is of little consequence so long as these hard woods are able to endure unimpregnated, for the same length of time. This is more or less the case with oak in Europe and with sal and teak in this country. Sal and teak, as also deodar, are used unimpregnated for sleepers in India. The class of woods which require impregnation are pines (*Pinus longifolia. P. excelsa, Abies Smithiana*) which are capable of taking up a full quantity of creosote or other antiseptic fluid. These light and less valuable timbers can thus be impregnated and rendered as durable as the superior deodar, sal, and teak. We find that of all the methods enumerated for the impregnation of railway sleepers, only three have to be considered. These are (1) creosoting : that is, the impregnation with common creosote by means of the pneumatic process. (2.) The method of introducing a solution of sulphate of copper by means of replacement of the sap in felled stems. (3.) The method of introducing a solution of chloride of zinc with the pneumatic process. A fourth method, *viz*, soaking the wood in a solution of corrosive sublimate comes next to the above three in importance, but the material is too expensive. Among the above three methods, creosoting stands foremost. It is the best antiseptic, and increases rather than diminishes the strength of soft wood, its effect being thus contrary to that of metallic salts. It resists more than other substances the lixiviating action of the water. Creosote, when used with the pneumatic process, doubles the durability of soft woods, and there is no risk of failures. Creosote also keeps off white ants, and creosoted sleepers are admirably adapted for India. The method of sap-replacement by means of sulphate of copper solution would not be generally applicable in this country, because the wood has to be floated and takes a long time to reach its destination. The use of chloride of zinc has the disadvantage of rapidly corroding iron, and consequently the nails soon become loose in sleepers impregnated with this substance. Yet this salt would be the one to substitute in the absence of creosote. The pneumatic is undoubtedly the most advantageous process. Apparatus and machines for the latter, such as we have described, could be procured and set up for about Rs. 12,000, all costs included. The price of substances used for impregnation naturally varies considerably. The following European prices are therefore to be taken only as approximate, and intended to give a general idea of the cost of antiseptics used for impregnation :—

PRICES PER TON IN EUROPE.

	£
Creosote	4
Chloride of zinc	10
Sulphate of copper	50
Per chloride of mercury	500

The total cost of impregnation varies even more than the price of the materials. The following data will give some idea of the cost of impregnating pinewood :—

		Pence.
Creosote by the pneumatic process, per	c. f. ...	4.
Chloride of zinc do. do.	c. f. ...	2·
Sulphate of copper by sap-replacement, per	c. f. ...	4.
Per chloride of mercury by soaking only, per	c. f. ...	4.

The cost of creosoting sleepers in India depends entirely upon the rate at which creosote can be imported from England, as there is at present no material with which to replace English creosote. Ship-owners dislike creosote as a cargo, for it necessitates the exclusion of other goods from the hold, and the same objection applies to the shipping of creosoted sleepers from England. Pine creosoted sleepers can be imported from England to Madras at 7s. 3d. per sleeper. It would be very desirable if Indian sleepers could be creosoted with some material procurable in the country. There are, however, no data at present to show whether any substance can be obtained cheap enough to compete with creosote imported from England. In this country, coal tar from the Gas Works is sold at the prohibitive price of Rs. 45 per ton This is almost as much as the price of English creosote sold at Madras, and besides this high price, only about 25 per cent. of the Indian coal-tar would be efficacious for impregnation. The use of Burmese earth-oil has been suggested, but there are no data to show whether earth-oil would act as a sufficiently good preservative, nor would Burmese earth-oil be much cheaper than creosote from England. The products of distillation from wood might be used instead of coal-tar oil. In Europe good wood-tar is procurable at £10 per ton, we fail to see why it should not be manufactured in this country for the same price. Wood-tar oil might even be dearer than creosote and still compete with the creosote, because the produce of the wood contains more of the valuable real antiseptic substance, than the produce of coal does. For the same reason wood-tar oil would be an excellent material to mix with English creosote. The question of the manufacture of wood creosote in India recommends itself as a subject of special enquiry. This much is certain, it is highly desirable to creosote in India sleepers from inferior Indian woods, wherever there is not an abundance of superior woods, and where, at the same time, the distance from seaports and the coast renders importation from England of creosoted sleepers so expensive as to make it almost impossible.

INSECT PESTS OF INDIA.

A FEW days ago one of our native contempories (*Reis and Rayyet*) blamed the Government of India for its apathy, and tardiness in the matter of introducing some useful measures for the destruction and extermination of insects injurious to food-crops and fruits, and cited the mango-worm as an instance of the havoc caused by this pest to one of the finest fruits of the country. "The fly is so tenacious of life that it thrives within the heart of the fruit. You cut a fruit apparently sound, without a spot on the surface, when, lo! the fly issues out of the interior and buzzes past you. These insects have degraded the East Bengal mango for at least more than half-a-century, and yet no notice has been taken of the matter." Another of our contemporaries (*Indian Daily News*) affected to treat this important subject facetiously, and asked why there should "not be a native Lubbock to enquire into these matters." While agreeing generally in the views of the *Indian Daily News* so far as they relate to entomological investigations being advantageously undertaken by learned country gentlemen (natives) having plenty of time at their disposal, "who might thus render a service to the people while engaging themselves in an interesting pursuit," we are decidedly of opinion that unless the Government initiates measures having for their object the destruction and extermination of insect pests, it is not likely that the native community will do much—or anything—in the matter. For many years it was found almost impossible to collect accurate statistics of the various staple crops of the country. The first step to supply this want was taken in the North-Western Provinces, by the local Government taking into its confidence the various landholders, zemindars, talukdars, &c., and inviting their co-operation. With what success the system has worked, need not be adverted to here; the report published by us last week of the Agricultural Exhibition at Lucknow, will have given our readers a fair idea of the satisfactory results obtained. In the same way, we think the Government should invite the co-operation of native gentlemen, landholders, zemindars, and others in a matter of such importance as the destruction and extermination of insect pests. That the subject is a very important one, will be recognised by those who have studied the entomological reports of other countries, and the enormous losses annually sustained by farmers, both at home and abroad, by the depredations of insect pests. So far as the matter relates to India, it has attracted attention at home, and has given rise to a correspondence between Surgeon-General E. Balfour, author of the *Cyclopædia of India*, and the India Office. In a letter, dated 8th August 1885, to the Under-Secretary of State for India, Dr. Balfour said :

> The article "Insects" in the 3rd edition of the "Cyclopædia of India and of Eastern and Southern Asia," is, I think, the first attempt to give a general view of the entomology of that wide region. This is, in many ways, a very difficult branch of natural history; but this article was prepared and printed by me under the care of two scientific men, one of them ranking among the most learned of living entomologists, and I was favoured also with counsel from Miss Ormerod, who, in this country, annually reports on the insects injurious to food-crops, forest trees, and

> fruits, and the prevention of insect ravages. The like of Miss Ormerod's form of reporting has never been done for India. Although every year, to some extent, and from time to time largely, losses occur there from the pests which attack agricultural produce, India has hitherto been remiss in this matter, contenting itself with references as to individual insects or blights to such persons as were thought likely to be able to give information. But the subject is of far too great importance to agricultural India to be left to be treated in so casual a manner, and the special knowledge now available might be utilised to describe the insects which injure the agricultural, horticultural, and forest produce of India, suggesting means of preventing, and remedies for same. The reports should be restricted rigidly to the injurious insects, and should be half-yearly, to fit in with the two great agricultural seasons.

Dr. Balfour was informed in reply that a copy of his letter had been forwarded to the Government of India. Later on, he informed the Under-Secretary of State that he had communicated with Miss Ormerod on the subject, who had expressed her willingness to render the movement any service that lies in her power. Miss Ormerod is so well known in the entomological world that her opinions will, we have no doubt, carry the weight of conviction. She is Consulting Entomologist to the Royal Agricultural Society of England, and this is what she says in her letter to Dr. Balfour :—

> I am very much obliged to you for favouring me with a copy to your letter to the Under-Secretary of State for India, relative to the importance of acquiring serviceable information regarding the injurious crop insects of India, and also kindly giving me a copy of the official reply. I do not see that you could do better, as a commencement, than thus bring the subject shortly and clearly forward ; and, as far as I can form an opinion, I think that the course you suggest would be the constant means of saving thousands of pounds yearly —occasionally (perhaps more than occasionally) of saving millions. I found this opinion, of course, on consideration of the unremunerative outlay so often occurring on some of the great crops, notably (as coming specially under my notice) the loss by ravage of coffee plant grubs. The information that is needed could be given by plain and simple jotting down by various persons of what they themselves have observed. One man notices, perhaps, how deep the grubs go ; another, how long they live ; and so, by collating the points, we get to know the whole history of habits, which is what is needed to work on. It may take a few years to get the whole life-history of the insects, but we soon get in the way mentioned above (on which plan my own reports are formed) to learn the main points, and then all observers are requested to find the missing part of the history. If reports were formed in this way, there would very shortly be a great increase of useful knowledge throughout the Indian Empire. I present my reports yearly to the contributors, thus they take a personal interest in the work, and, what is immensely important in things of this kind, the book comes to them on publication ; they have not the trouble of ordering it. The expense would be a mere nothing to Government, seeing that I, a private individual, have now for eight years, without the slightest assistance, carried on the work in England. The great mistake is in waiting until attack is unusually destructive, and then consulting those who, though eminently skilled in classification of insects, have no idea, or well founded knowledge of the points of agricultural treatment or forestry which must be brought to bear on the insects in some special stage of their life. Likewise (as occurred not long ago) to advise reliance on the insectivorous animals of England for help in India or Ceylon is a decided mistake. If, from the long experience which I have now had of gaining information on insect attack, and forming it into readable shape, you think any suggestions on my part would be of service, I should be most happy to give any attention in my power to the subject. But, meanwhile, I may most truly say that if the crop, or timber, or fruit growers of India were furnished with plain and comprehensive accounts of the history and habits of the common insect pests, accompanied by woodcut figures, so as to convey the appearance of the pests without wearisome descriptions of details, that all this would be a national benefit, soon paying the outlay hundreds of times over.

It is satisfactory to know that the India Office has taken the matter in hand, and has transmitted a copy of the correspondence to the Government of India, who, we hope, will take proper steps to initiate measures for the dissemination of entomological knowledge on the plan suggested by Miss Ormerod, and the collection of accurate reports on a matter so vitally affecting the welfare of agriculture in India.

MEDICINAL AND OTHER USES OF THE EUCALYPTUS.

The Agricultural Department of the Government of Madras has been at some pains to draw up a memorandum, comprising extracts[*] from various sources, relating to the medicinal uses and other virtues of the Eucalyptus order of trees, commonly known as the "Australian Blue-Gums." The many valuable properties possessed by this genus of trees have attracted a large share of public attention ; and although a good deal of these properties have come to be well known, new and important uses are being found for the leaves in various forms. The information collected by the Agricultural Department is very interesting. The memorandum opens with an extract from *Bargoyne, Burbidge and Co.'s Circular*, in which it is stated that "the oil of *Eucalyptus globulus*, as a substitute for carbolic acid, has been much advocated of late. It is a most valuable antiseptic, and has obtained the happiest results in bronchial catarrh. Professor Lister is of opinion that the *Eucalyptus globulus* should supersede carbolic acid as an antiseptic because of its harmless nature." The *Companion to the British Pharmacopœia* is also quoted, in which it is said that "liquid extract of *Eucalyptus* gum 1 part, water 2 parts, dissolved and strained, is an excelent remedy in arresting bleeding from the nose. Lint dipped in it checks bleeding from wounds. The gum is used in doses of 5 grains every four hours in diarrhœa and dysentery. The oil is obtained from the leaves by distillation." The *Medical Times and Gazette*, in an issue of 1882, in noticing the *Eucalyptus Globulus*, stated that the oil is said to diminish the action of the heart and the blood pressure, and to act as a stimulant, astringent, and antiseptic on mucous membranes. Dr. Currier spoke highly of its use as a disinfectant and antiseptic in chronic ovaritis and tumours of the breast, in removing the fœtor of the discharges, and relieving the pain and discomfort. The *Export Prices Current and Trade Report*, in an issue some time back, observed that "the leaves of several of the species, when duly prepared and compounded into an ointment, are found to possess, healing properties, which, without exaggeration, may be termed remarkable. Josephson's ointment is the property of Messrs. E. Row and Co. of New South Wales. In the colonies it has achieved, we believe, considerable success in the treatment of wounds, &c." Dr. J. M. Gibbes, Coroner of New Zealand, in an article addressed to the *Australian Medical Gazette*, during a severe epidemic outbreak of diphtheria, recommended the following treatment for this horrible disease : "*First.*—After swabbing the throat with liq. fer. perchl. dil. and glycerine. *Second.*—Pour boiling water on blue-gum leaves and let the steam be inhaled day and night. Drawing steam through an inhaler, or holding the head over a jug, is a most wearisome process, and you find that patients, especially children, soon get tired of it ; so I order the pan, jar or jug containing the infusion to be placed on a chair besides the bed, and a tent of the bed-clothes to be placed over it and the patient's head. This conveys the steam to the patient without exhausting him. Children soon feel the soothing effect, all uneasiness and pain in the throat leaving. Of course in mild cases the steam does not require to be used so often. In several cases, after 5 or 6 hours' steaming, complete casts of the air-passage were coughed up, and the breathing became easy at once. One young lady tapping the upper part of her sternum, said, 'It is here.' She could not swallow a tea-spoonful of water ! Her lips were blue and her face of a dusky hue ; but after hours of steaming the membrane was coughed up, and the breathing became at once easy. In *one* case, where steaming was *not* carried out, the little patient was semi-asphyxiated for three days before death put an end to her sufferings. It was the first case of this epidemic that I saw, and was not able to sufficiently impress the attendants with the importance of the constant use of the steam. In blue-gum steam we have a most perfect disinfectant, as in no single case, after the first twenty-four hours, was the breath unpleasant, and the swelling in the neck quickly subsided. Towards eight o'clock the diphtheria patients generally became feverish, restless and unable to sleep, and it was wonderful to watch the soothing effects of the steam. A bucket was generally placed in the room containing the blue-gum water, and a red-hot poker placed in it, which at once filled the room with steam, and very shortly after one child after another would fall asleep. Twenty-four cases were treated as above, with the death of only one infant, aged eight months. There were six other children ill in the same family, and not one case of paralysis has occurred amongst them, although two treated with sulphur by their parents are badly affected. I think that I can claim for the above treatment—

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[*] We have arranged these so as to run one into another.—Ed., *I. A.*

1st.—Great simplicity.

2nd.—That it follows nature's own method of getting rid of the membrane, namely, by suppuration.

3rd.—That it prevents paralysis from following.

4th.—That it cures the severest cases."

Dr. Ross, M. D., in a letter to the *Sydney Mail*, describes an extraordinary cure of a wound. He prefaces his letter with the following remarks: "I am forced, from careful observation and long experience of bush life, to believe that the majority of our gum trees, no matter in what form used, whether in the shape of their leaves in their natural state, or dried, in ointment, powder, decoction, gum, extract, oil or alkaloid, all inherit virtues. Time alone is bound to bring them into more general repute as an invaluable antiseptic and agent for counteracting lethal or poisonous exhalations; a cooling, healing application to wounds and ulcers, or rheumatism and a salutary remedy in parasitic disorders in sheep." "I shall now," he goes on to say, "submit the following short extract of a remarkable *spear* wound case:—On the 28th December 1864, I found the abdominal wound wide open and gaping, and the bowels protruding, accompanied by a quantity of ichorous serum oozing from the large orifice Had taken no medicine. His gin, sitting by his side, in the bough gunyah, attentively bathed the wound and swollen abdomen with a few of the most tender shoots and leaves of the red-gum tree, steeped from time to time in hot-water. In consequence of the untoward appearance of the wound all chances of his recovery seemed now to have been quite taken out of my hands, for to attempt to close the wound, under the circumstances, would not only have been perfectly futile, but have added to the danger as the swelling was rapidly increasing, so much so that the case appeared quite hopeless and the pulse was sinking. On returning in the evening, I found to my great surprise and astonishment that what I had considered to be a useless and cruel sort of application had not only lessened the size of the wound, but had positively had the effect of reducing the swelling. Seeing such results, of course I could make no further objection to the use of this strange application in the shape of gum-tree leaves, and the sixth day found the abdominal wound closed!"

The *Extra Pharmacopœia*, 1884, has the following:—

Eucalyptus foliæ (Eucalyptus leaves).—Dose five grains, or more, in powder. The dried leaves of the *Eucalyptus globulus*, or blue-gum tree of Australia, have been employed medicinally in the treatment of ague and bronchitis, and are now much used in Italy for Roman and malarious fevers; also, when coarsely powdered, are employed for smoking in cigarettes in cardiac and aneurismal asthma. The narrow leaves, mostly scimitar shaped, are more active medicinally than the broad leaves of herbaceous shoots.

Oleum Eucalypti.—Dose 1 to 5 minims emulsified with olive oil. Is distilled from the leaves of the *Eucalyptus amygdalinæ* and also from those of the *Eucalyptus globulus*, and probably from other species. It is to this oil, and also especially to the great avidity for water which this tree has when growing, that it owes its anti-malarial influence. The oil is a powerful antiseptic, and has an ozonizing influence on the atmosphere while it oxidises It has a pale yellow color, a penetrating, camphoraceous odour, sp. gr about 0·900, and boils between 338° and 392° (Fahr). It is not caustic like carbolic acid, nor does it produce much irritation, although it is very destructive to low organic growths. It is soluable in oils, fats paraffins, and alcohol, but only a trace dissolves in water. The oil is useful (mixed with an equal quantity of olive oil as a rubefacient for rheumatism. A large percentage of *Eucalyptus* oil consists of "*Eucalyptol*," which is also met with in commerce, and is that part of the above oil which passes over between 338° and 352° F. It is obtained by treating the latter with caustic potash, then with chloride of calcium, and subsequent distillation.

The following extract, taken from the *Australasian*, enumerates the manifold virtues of this remarkable genus of plants:—

Baron Von Mueller has been at the pains of collecting and collating testimony from the scientific publications of many countries, and he cites recorded cases resting on the authority of practitioners of eminence to show that *Eucalyptus* oil possesses almost unique virtues as an antiseptic, as an agent for the reduction of the pulse in phthisis and typhus, for the diminution of bronchial catarrh, for combating incipient or threatened gangrene, and for healing certain ulcers. Dr. Wooster, of San Francisco, enumerates 129 cases of various diseases, 96 of which were cured by the administration of the fluid extract of *Eucalyptus* foliage. In 23 cases of remittent, intermittent, and typhoid fever every one yielded to the treatment. The American Faculty are using the extract largely in cases of diphtheria and scarlatina with the most gratifying results; and in severe cases of cystitis, it has effected cures when all ordinary remedies had failed. In the practice of a single physician in New York, 100 diphtheritic cases have been successfully treated by the fluid extract. *Eucalyptus* inhalations, it has been found, are capable of overcoming catarrhal asthma and whooping cough, and of arresting pulmonary consumption.

The *Pharm. Zeitung*, a German paper, says:—

Rodolfo Rodolfi recommends, from personal experience, the chewing of two or three dried leaves of *Eucalyptus globulus* as a sovereign remdy for cold in the head and coryza, provided they are recent and not chronic. The effect generally makes itself felt in half-an-hour.

As an instance of some of the novel uses to which *Eucalyptus* Oil has been put, other than medicinal, the following paragraph was published some time back in the columns of the *Indian Agriculturist*:—

A process has been invented in America for the manufactur- of a preparation of the gum of the *Eucalyptus globulus*. It has the effect of removing thoroughly the *scales* which form in engine boilers, and thus prevents rust and pitting. The result of the introduction of this preparation has been so great as to create an immense demand for it both in America and Europe. The effect of this preparation in preventing the pitting and corrosion of boilers will, it is expected, extend the period of their usefulness 100 to 150 per cent, and at the same time effect a great saving in fuel, as scale is a non-conductor of heat, and therefore more fuel is required to generate steam in old boilers than in new clean boilers.

The Director, Government Cinchona Plantations, Parks and Gardens, Nilgiris, furnished the following method of obtaining the oil from the leaves of the *Eucalyptus globulus*:—

"The leaves of many of the *Eucalypti* yield very good oils, and few are more valuable than that obtainable from the *Eucalyptus globulus*. The way to extract the oil is as follows:—Fill a large still with the macerated crushed leaves and water, and distil at a low temperature. Shake up the product with a little salt (this causes the oil to separate more rapidly from the water which comes over with it from the still), decant the oil from the water, and filter through the paper. The leaves should be macerated for twenty-four hours, and then mashed up. This process facilitates the extraction of the oil by breaking down the cells which surround the glands that contain it."

It will thus be seen from the foregoing that the Eucalyptus order holds a high place in the medical world. Steps were taken some years ago, when the valuable properties of the *Eucalyptus globulus* were first made known in this country, to cultivate the tree all over India, as a means of ascertaining whether it would succeed here. Constant mention is made of these trees in the annual reports of the various Botanical and Agri-horticultural Gardens; and although their cultivation has not been attended with unqualified success, yet sufficient is known to warrant the hope that in time the Eucalypti may become completely acclimatized in India.

Miscellaneous Items.

On the 30th of September there were no less than 197,748 persons employed on the various railways in India. Of these, 189,439 were natives, 4,069 were Europeans, and 4,250 East Indians. This shows that 95·79 per cent of the entire number of employes were natives.

The quantity of salt of every description cleared during the second quarter of the current year was 28,51,562 maunds, against 26,41,346 maunds in the corresponding quarter of last year. The nett amount of duty levied was Rs. 25,41,617, against Rs. 50,17,357 in the corresponding quarter of the previous year.

The opium revenue for the year promises well, although the actual returns for Bombay in November were worse than the estimate by Rs. 10,29,650. Taking the eight months of the year that have elapsed, the Bombay pass duty show a total advance upon the estimates of Rs. 15,28,475; while in Bengal, on the other hand, there has been a total falling off in the sales of upwards of two lakhs,

The complaint raised by the proprietors of the salt pans at Goa that the indemnity due has not been paid by the British Government is much commented upon by the Goa press. It now turns out that the delay was due to the Portuguese rather than the British Government. In accordance with the provisions of the Luso English Treaty the Goa old money was recoined at the Bombay Mint, and bills were eventually submitted for payment, of which the Treasury of Goa took no notice. The reminders that were sent from time to time did not receive any better attention. So the payment of the expenses of recoinage, amounting to some ninety thousand rupees, was put off until the British Government, growing impatient of the delay, intimated that, if the amount were not paid off at once, it would be deducted from the indemnity due to the salt-pan proprietors. The Treasury Department of Goa was taken aback by this unexpected arrangement, but having no plausible excuse to offer, meekly acquiesced. So far good, says a correspondent. But what about the salt-pan proprietors? The poor fellows will have to wait perhaps years before they get their dues.

A contemporary says:—Our readers may possibly recollect that two or three years ago, the attention of the Government of India was drawn to the extraordinary and increasing number of notices of ejectment that are annually served upon the tenants in Oudh. It is a peculiarity of the Oudh Rent Law that an immense majority of the tenants in the province hold on a yearly tenure, and are liable to ejectment upon very brief notice every twelve months, at the pleasure of the landlord. There can be no doubt that such a system is disadvantageous to the joint interests of both landlord and tenant, since it has been pronounced detrimental to agriculture by all authorities on land tenure, although, like every other system, in the hands of a good landlord, it may be worked without much positive mischief. Lord Ripon's Government took up the question rather warmly; some official investigations were made in all the Oudh districts, and after the usual protracted discussion the whole correspondence went home to the Secretary of State. We believe that the local Government has now at last been authorised to bring certain definite proposals to the test of practical discussion, and to frame some amendments of the present Rent Law that will give greater stability to agricultural holdings in Oudh, upon the basis of an extension of the term within which tenants shall be exempt from arbitrary ejectment, with some limitation for the present unlimited right of enhancement. There is good ground for believing that the talukdars will be found willing to acquiesce in any such scheme of reasonable reform. Indeed, in these times of heroic remedies for agrarian distress, when the wildest projects for dismissing landlords and distributing the land are rife in Ireland, and even in England, and advocated by leading politicians, there is manifest wisdom in showing a disposition to accept and expedite any proposals for prudent and moderate reforms. If, especially, these reforms avoid reviving old disputes about hereditary tenant right, and are chiefly directed towards the equitable regulation of agricultural contracts, with the object of giving a tenant sufficient time for improving his land and adequate security for his investments, it is difficult to suppose that they can meet with any material or well-founded objection from any quarter.

Selections.

PARASITES AFFECTING ANIMALS.

STRONGYLUS FILARIA AND STRONGYLUS CONTORTUS IN SHEEP.

The following paper, as briefly noticed last week, was read at a meeting of the Galawater Farmers' Club the other day by Mr. W. D. Connochie, V.S., M. R. C. V. S, Selkirk:—

Before proceeding with the subject upon which I have chosen to address you to-night, I must offer an apology for any inconvenience or disappointment I caused the members of the Galawater Farmers' Club in not being able to fulfil my engagement at their last meeting. Exigencies of a peculiar kind, and which I could not control, precluded me from being present at that time, therefore the necessities of the case is my apology. However, I am here to-night to atone for any shortcomings on that occasion, and will endeavour, however inadequately, to fulfil the promise that I then made.

ANIMAL PARASITES.

The subject that I have chosen to bring under your notice is a wide one. The number and variety of parasites affecting animals externally and internally are exceedingly numerous. I find that to attempt a classification of the different orders, and to enumerate every known species of parasite affecting animals, would be a weariness to you, and serve no useful purpose.

In classifying parasites, they are generally described as Endo-parasites when they infest the internal organs, such as the stomach and bowels, lungs, liver, kidneys, &c, and as Ecto-parasites when found on the external surface of the body. The appearances presented by animals affected with external parasites are familiar to most of you; therefore, I do not intend to notice them further now, but purpose to confine myself to the consideration of one or two of the more important of the internal parasites, or Entozoa, familiarly known as worms, whose frequent occurrence in the animal body, and the variety of disorders which accompany and flow from their presence, demand the utmost attention from every stock-owner and the special study of every veterinary practitioner.

The occupancy of animal bodies by parasites presents a very remarkable and very little understood feature in the laws of nature, for it does appear to be a principle in the economy of nature that almost every species of animals, either during life or after death, shall be subject to the incursions of some other species. It is difficult to find a satisfactory explanation for any such law, unless it be a provision for the fulfilment of another recognised principle of nature, that every situation which is capable of sustaining living beings shall be peopled with them.

There are at least six orders of parasites which have a special interest to stock-owners and veterinary practitioners, viz — *Nematoda*, *Trematoda*, *Cestoda*, *Acanthocephala*, *Diptera*, and *Frachearia*.

Nematoda, or round worms, of which the *Strongylus filaria* and *Strongylus contortus* are examples, whose general appearances and mode of development in the different situations in which they are found, together with the symptoms presented by animals infested with them, the morbid conditions connected with their presence, and lastly, their treatment, curative and preventive, I purpose to consider as concisely as possible.

Strongylus filaria is that small round thread worm of a yellowish white colour, from 1 to 2½ inches long, found in the air passages and lung tissue of lambs and young sheep, and which are the cause of that serious and destructive malady termed 'the lamb disease.' Another parasite of a similar appearance, the *Strongylus micrurus*, is the cause of the disease in calves and young cattle termed 'hoose or husk,' from the animal suffering from them being subject to violent and convulsive fits of coughing. The pig is also infested with a similar worm which is termed *Strongylus suis*. Although all these strongyli present under the microscope a slight difference in their anatomical formation, they have all a certain character in common, so that a description of one of them is sufficient for all practical purposes.

Through the usual courtesies of Mr. Owen Williams, Professor of Morbid Anatomy in the New Veterinary College, Edinburgh, who has made these parasites a special study, I am enabled to show you a specimen of each of these preserved in spirits. As I stated before, you will observe that they vary in length and thickness, having a uniform body tapering towards each extremity unless in the case of the female, which, when pregnant, assumes a sort of barrel form. It is a singular fact, and one worth recording, that the females of the strongyli as in the case of females in the higher order of being, largely predominate over the opposite sex. When we observe the extraordinary development of the procreative organs, we cease to wonder at the rapidity of their reproduction. How they originated or were reproduced was long a subject of controversy. Their origin has all along, and is still involved in much obscurity, though recently their reproduction and development have been pretty clearly demonstrated by Dr. Cobbold, of London, who has given more attention to this special study than any living writer, at least in this country But even he is forced to admit that 'with the exception of *Trichina spiralis*, I am not aware that we have a thorough knowledge of the entire life-history of any of the Nematoda species which infest the human body, nor, indeed, can I call to mind any round worm infesting the lower animals, whose life phases, migrations, and peculiarities of structure during development are satisfactorily known.' That being so, it would be altogether unprofitable for me, in a popular essay, to enter at any length upon a question involving so much speculation. It will be sufficient if a few of the more important points which have been advanced are noticed. Some have contended for their spontaneous generation within the body, due to a diseased condition of the tissues. Some have contended for their external origin in all cases; whilst others again, amongst whom are the most recent observers, maintain that the ova and young parasites are conveyed with the food and water into the alimentary canal, where they become absorbed into the circulation, and thence conveyed in the blood stream to the different situations where they find a suitable nidus for their development.

SYMPTOMS.

The symptoms presented by animals suffering from *Strongylus filaria* differ according to the severity of the attack and the different organs affected with them. If the lungs and respiratory passages are alone infested, the peculiar cough accompanying their presence will be the characteristic symptom, which, when once heard, is not readily forgot. Those of you who have had the unfortunate experience of these filaria infesting your flocks cannot have failed to observe the distressing nature of the cough and the sounds emitted in connection with it. I have, when standing in the midst of a large flock of diseased sheep, compared it to nothing less than the meeting of contending armies. You have every sound, from the rattle of musketry to the roar of the cannon, even from the moans of the wounded to the groans of the dying. If, as is often the case, the parasites infest also the stomach and bowels, then the symptoms are more complex. In addition to the cough, there will be indications of abdominal pain, grinding of the teeth, insatiable thirst, diarrhœa, or dysentery, with hectic fever. These will differ in severity, according to the particular organ they infest and the degree of impairment to its functions caused by their presence. It is a remarkable fact that the body may be infested by thousands of worms, and yet no symptoms whatever manifest themselves, so that their existence is not even suspected This is the case with the *Trichina spiralis*, whose seat is the muscular system of the human race. They may exist in such numbers as to defy enumeration, yet their presence does not seem in the least to impair the functions of the part in which they are imbedded, and as mentioned by Professor Williams, sheep have been killed in prime condition by the butcher and their lungs found loaded with filaria. If the above-mentioned symptoms increase in severity, in addition will appear rapid wasting of condition, impaired or total loss of appetite, enlarged abdomen, and anæmia, when death ends all.

MORBID APPEARANCES.

On making a *post mortem* examination on the carcase of an animal which has succumbed from these parasites, if the lungs have been the seat of these worms, they will be found covered with numerous nodules varying in size and hardness according to the length of time they have existed. When these nodules are cut into, they will be found to contain worms of various sizes, coiled upon themselves. When occupying the intestinal tract they will be found in bundles coiled upon themselves, and covered with mucus. The accumulation of mucus in the intestines when these parasites are present has led certain investigators to believe that it was the cause instead of the consequence of their presence.

TREATMENT.

We now come to treat of what to stock-owners at least may be considered the most important part of the subject, viz., the destruction and expulsion of these parasites from animals when infested with them and the prevention of their recurrence, or of gaining access into the system. When any of the filaria have once gained access to any of the organs which they inhabit, it is often very difficult to effect their expulsion. Many have been the medicinal agents recommended for that purpose, but, unfortunately, after trying most of them, the result proves anything but satisfactory; and that is not to be wondered at, seeing that, from the situation of many of the organs infested, medicines only can reach them indirectly through the circulation of the blood, and it is only those which occupy the stomach and bowels that may be considered directly within the range of medicinal agents. Of all the medicines that have been tried for the expulsion of worms, the oil of turpentine, along with any of the bland oils, constitutes one of the best vermifuges, because it not only acts as a poison to the parasite, but also as an evacuant, thereby clearing the alimentary tract from all accumulations of mucus which seem to act as a nidus favourable to their development. This medicine is easily administered in the case of cattle, or when only a few sheep are affected, but when whole herds or flocks are affected it is almost hopeless to attempt it. We must then have recourse to medicines which are comparatively tasteless. Chloride of sodium—common salt—by itself among the food, or in combination with one of the preparations of iron, has proved of considerable efficacy. For several years I have used with good results a preparation composed as follows:—Sulphate of iron 15 grains, tartarate of antimony 10 grains, nitrate of potash 20 grains. This is a dose for a sheep, one to be given each day mixed in their food of crushed corn, cake and bran. Along with the medicine and hand feeding it is imperative that the animals be moved to a different pasture, and one that has not been grazed over before by older animals, and as the disease is neither hereditary nor contagious, the older animals may graze on the pastures the younger one has left with impunity. If these remedies fail to have the desired effect we must have recourse to other measures And indeed where the air passages are alone affected, it is necessary that we should have resort to the inhalations of chlorine or sulphurous acid gas. This can be effected by having the animals in an enclosed building and setting fire to sulphur in their midst, taking care that the fumes are not too strong or continued too long so as to cause suffocation. This can be prevented by opening the door and letting in a quantity of external air. About a pound of sulphur to 60 sheep and the time they should be confined 20 minutes, of course much depending on the size and close state of the building.

Another remedy which has only very recently been brought under notice for the destruction of parasites in the air passage is the direct introduction into the trachea or windpipe of agents such as carbolic acid, creosote, turpentine, or prussic acid, with a small syringe, which operation is termed intra-tracheal injection. But as the operation, though simple, requires a professional or at least one who knows something of anatomy, to perform it, it is not necessary for me to notice it further now It now remains for me to notice what can be done by way of preventing the introduction to, and development within the system. As already stated, it is very difficult to destroy or eradicate parasites after they have gained access to any organ. It is of the utmost importance to prevent their doing so. Although we do not yet know all the places and migrations which these parasites undergo before they reach their several situations in the animal system, we do know that they are the habitants of low-lying damp, marshy ground, and of stagnant pools and ditches; from these they are distributed over the pastures in wet seasons, and are there taken into the system along with the food. Hence the necessity of preventing animals, especially lambs and calves, from feeding upon such places When lambs are weakly it is a *sine qua non* of their existence that they be placed on dry, clean, and fresh grass, which has not been grazed over by older sheep. In addition to these measures, I attach the greatest importance to the top dressing of the land with lime or salt, especially salt. I am convinced that if tracts of rank, coarse, indigestible herbage were periodically burned, and from 6 to 8 cwt per acre of crushed rock salt applied, the mortality and loss from parasitic diseases would be greatly lessened. I do not advise whole stretches of pasture to be sown over with salt, but two or three acres at intervals, so that animals could have their choice of what to feed upon; salt being the natural stimulant of the digestive organs in animals as well as man, they should always have free access to it. But besides acting as a stimulant to the digestive organs, by applying it to land in the manner described, it has the effect of destroying the parasites either in the ova or larva state. Taking the manurial value of salt into account, I often wonder that it is not more used for that alone. I sometimes think that it is its cheapness that militates greatly against its more general use. For their own profit agriculturists should still look upon it as the salt of the earth.

The *Strongylus contortus* is a habitant of the fourth stomach of the sheep and goat, and is the cause of the disease termed 'parasitic gastric catarrh.' Through the kindness of Professor Williams, I am enabled also to show you a specimen of them. Those were found in the fourth stomach of a sheep belonging to Mr. Elliot of Hollybush, where Professor Williams was called in consultation with myself. These are the only specimens of the contortus that I have seen. I believe that to Professor Williams is due the credit of either seeing or describing it, in this country at least. You will observe that they very closely resemble the filaria, with which they are often found consorting together, and it is the opinion of Gerlach, an eminent Prussian veterinary surgeon, that they are much akin. Professor Williams says:—'It is now believed that the ova of these parasites, passed from the body of their host, retain their vitality in damp places only, and that where nice bites of green grass, such as that growing on the sides of open drains, and damp spots on pastures otherwise dry, are sources of danger, the parasitic ova becoming infested with such grasses. The prevention of the disease by destruction of the worms should be attempted by first digging up, where possible, all such green grasses, and inverting the sods; second, by a liberal application of salt to the land, and, where possible, an allowance of it to the sheep During wet seasons the above precautions are impossible, and all that can be done is to remove to the driest pastures. Give corn where possible, and an allowance of common salt in the food.'

To those who desire to learn more of this parasite, I refer them to the latest edition of Professor Williams's *Principles and Practice of Veterinary Medicine*, where they will find it very fully described. I am glad to find such an eminent authority corroborating what I have often ventured to affirm respecting the application of salt to the land.

A few years ago, when sojourning for a short time on the shores of the Solway Firth, I observed a lot of sheep grazing on low-lying land, which at the flow of the tide was partly covered by the sea. I noticed the sheep kept close to the water as the tide receded. I was informed by the shepherd who tended them that they were there as regularly as the tide ebbed and flowed. Instinctively they discovered that drinking the sea water left in hollow places was for their benefit, and that when the tide troubled the waters they found that they proved to them veritable modern pools of Bethesda. Incidents such as that point very conclusively to the absolute necessity of animals having free access to a liberal allowance of salt. From what I have said, I do not wish you to infer that I consider common salt to be a panacea for every ill that animals are liable to. But I would just repeat what I have already said, that if tracks of rank, coarse, indigestible herbage were periodically burned, and from 6 to 8 cwt. of crushed rock salt sown upon the surface, the loss from parasitic, ay, and other diseases, would be remarkably small. I am one of those who believe that notwithstanding the very best agricultural management and the most enlightened veterinary advice and treatment, that disease and epidemics of disease, like the poor, shall never entirely cease out of the land. But the working of the Contagious Diseases (Animals) Act, with all its imperfections, goes to prove that much can be done by human measures and human means to arrest their ravages, if not entirely to stamp out their periodic visitations.—*North British Agriculturist.*

DAIRY FARMING ON THE CONTINENT.

THROUGH the aid of landowners and others in the district, the Bothwell Farmers' Club were enabled to send a deputation to the Continent to report on the systems of dairying practised there; and the following long but interesting paper was read before the Club the other night as the result of their mission:—

In accordance with the decision of the Club, your deputation started on Thursday, the 18th of June last, and proceeded *via* Leith in the good ship *Thorsa* for Copenhagen. Our course across the German Ocean was almost due east to the southern end of Norway, which we reached early on Saturday morning, calling at Christiansand, where we were allowed an hour ashore. We took a short walk, and were rather struck to find almost the whole buildings erected with wood, tidily kept however, and neatly and tastefully painted. We saw little to interest us from the agricultural point of view, the crops showing evidence of lateness, and would probably require to be cut before being properly ripened. The trade of the port seems to consists chiefly in exporting timber and fish. After a short stay we proceeded on our way, reaching Elsinore, of historic interest, about midnight on Saturday, and Copenhagen early on Sunday morning. When we came on deck, we found the ship hands busy discharging cargo, and the custom-house officials looking upon us with suspicion until our baggage had been turned over to their satisfaction. Traffic seemed to be proceeding in the city very much as on ordinary week days, the shops and offices being open. Having an introduction from Mr. Jenkins, of the Royal Agricultural Society of England, to Mr. Segelcke, Professor of Dairying in the Royal Veterinary and Agricultural College at Copenhagen, we waited upon him, and had a most interesting interview, as to the objects we had in view, and generally on the present state of agriculture in Denmark. Unlike this district of Scotland, where mining and ironmaking take the first rank in our industries; agriculture in Denmark is the chief and almost only pursuit of the people, and, therefore, more encouragement is given by Government towards the promotion of scientific knowledge in regard to it.

We were informed that for fully twenty-five years Professor Segelcke had had a stiff battle to fight to bring about the present advanced state of dairying. His first aim was to interest the farmers themselves in the operations of dairying, remove the prejudice of their wives and daughters, and finally to obtain for as many as possible a scientific education, and thus combine 'practice with science.' His aims were at first looked upon as visionary, but by steady perseverance he has been able to show the supreme importance of a scientific education for successful farming.

The great bulk of the land in Denmark is held by peasant proprietors, their average holdings carrying only about six milk cows. It seems a large proportion of these proprietors have to meet a considerable rent in the way of interest on mortgages, and they complain loudly of local burdens. It was interesting, however, to find that from some of those small farms young men, after having spent a few years at the general round of practical farm work, went up to Copenhagen, and, like many noted men in our own country, obtained a scientific education with frugal fare; and we were informed of a case where a student, during recess, did not disdain to eke out a living by taking navvy work, and others accepting such situations as might open up to them.

Through the kindness of Professor Segelcke we obtained an introduction to Mrs. Hannah Neilson of Havartigaard, a farm of 170 acres, about 14 miles north-east of Copenhagen, and having arranged for an interpreter, we drove early on the following morning to her farm. On the outskirts of the town we found considerable areas devoted to market gardening. The absence of fences and the extensive cultivation of rye naturally soon arrested our attention. Considerable areas of clover and sown grasses were also noticeable; in some cases it was being cut green for the cows in the steadings, and in others being pastured in the way peculiar to the country, *viz.*, by tethering the cows in a row, with spaces between each other of 30 feet, each animal having a 15-feet tether. It was interesting to notice the long rows of cows, and also horses, grazing in this way, and the system has the appearance of being an economical way of pasturing, the animals being regularly watered from carts and shifted to fresh pasture as required. The road to the farm is a fair specimen of a good country *side* road, and the homestead is an enclosed one with a comfortable and substantial appearance. It is wholly roofed with a thatch of strong reeds. The entrance is by a large close door, through a covered passage, opening into a central yard. The dwelling-house of two storeys and sunk flat occupies the west side of the courtyard, the sunk flat being used as the milk room, churning room, scullery and kitchen, and servants' apartments; the south range contains chiefly the stable of 8 stalls and single cows' byre of 23 stalls; the east range consists of goats' house, root house and byres for young stock; and the north range is taken up with the barn and straw house, and some apartments in connection with the dwelling-house. In outside ranges we found an ice house, and accommodation for young stock and poultry. The milk house, from its low level, can easily be kept cool. The horses and milk cows are found under the same roof, facing each other, with a feeding passage along the centre. The stable stalls, 8 in number, are too narrow for the comfortable rest of the horses, and the cows are apt to foul their stalls by pushing their heads over their feeding troughs into the feeding passage. On a farm in Belgium, we noticed an experiment being tried to obviate this by erecting a sparred frame hung on pulleys with a back balance. Along the heads of the cows is one long trough, without divisions, formed of red brick into a semi-circular shape about 12 inches diameter, and there is a crane at the one end for supplying water for drinking and cleansing purposes. Our own arrangment of glazed fire clay troughs now generally used is we think, a better one. The water for the steading is from a well in the back courtyard, supplied we were told from springs, and pumped up to cisterns by horse-power; but its situation in close proximity to the dungheap aroused in our minds the strong suspicion that contamination would take place. We found Mrs. Neilson, a very good specimen of a farmer's wife. We arrived at the steading at 4 45 in the morning, and found the dairy operations, in which she took an active part with her staff of eight dairy pupils, in full swing at that hour. She was most courteous, and willing to communicate any information that we wanted, and it was very interesting to be told that amongst her scholars were young ladies of good families, going through the practical detail and regular routine of the dairy work. Two of her pupils had been taken to some place near Edinburgh as teachers, but she complained of the treatment they had received; whilst the labours of one who was at Dunstaffnage Castle at that time, seemed to be much appreciated. Each cow's milk by itself was weighed as brought in, and we found an accurate statement of the yield per annum of the different animals and of the income derived from their produce. All the milk, as soon as weighed, is taken down into the milk room, and there cooled by what is known as the Swartz system. On the floor stand three long tanks, built of brick and cement, about 2½ feet deep by 2 feet wide, with water running in at one end and a plentiful supply of ice to keep down the temperature. The deep narrow tins containing the milk are then placed in the running water, with the result, that the greater part of the cream is extracted from the milk in a shorter space of time then by the ordinary method, and leaves the skim milk available for cheese-making before being tainted. After standing in the water for twelve hours, the cream is carefully taken off, mixed with a little butter-milk to hasten the souring, and stands for about twenty four hours. It is then heated up to 56 or 57 degs. Fahr., and churned in a little upright Holstein churn for fully thirty minutes. Whenever the little granules of butter begin to gether the milk is drained off from the bottom of the churn, and a quantity of clear cold water put in, and the dasher put gently in motion. That water is again let off and renewed till it leaves the butter free of all milky material. It is now taken out and placed in a tub, and turned over with beaters till free of water, when about 3 per cent of salt is mixed with it, and let alone for twelve hours, when it is wrought again, and placed in the wooden pails familiar to you all. By this system 25 lbs. of milk yields 1 lb. of butter. Mrs. Nelson also gave us as her opinion that butter made from whole milk properly ripened is as good as from ripe cream, but it is much more difficult to manage the ripening process. All the produce is retailed from her own shop in Copenhagen, and as the Royal family are supplied with their butter from this farm, it is all stamped with the crown and arms of the King of Denmark, and sold in clean little pots of 1 or 2 lbs. each. Mrs. Neilson has agreed to send through Mr. Speir some of her butter to compete at Kilmarnock next week. She was also doing apparently a good trade in what might be called fancy cheese-making. That morning she had two kinds on hand, *viz.*, Cheddar and Edam. The Edams are the round blue ball like cheeses, we occasionally see in the shops, weighing about 5 lbs. Both kinds were being made much the same as Cheddars are made here; but as she was working on a comparatively small scale, she had not the utensils, nor the conveniences of any of our best cheese dairies at home. None of her cheese did we consider anything extra in quality. She also makes a soft cheese, something like roasted cheese, each about the size of a two-penny pie, and weighing about 1 lb., which she retails at 1s. per lb. She makes more or less of each kind as her customers require them. At the close of our interview we were hospitably entertained by Mrs. Neilson, and shown her various prize medals and certificates, and we left after adding our names to the visitors' book.

About 4 miles to the south we came to the farm of [illegible] acres, and owned and farmed by a Danish Vice-Consul, who [illegible] speak English fluently. The farm consists of [illegible] carries 120 milch cows. The steading is a very large one, with a barn that will hold over 50 tons of straw. The average produce of the cows is 900 gallons a year, and they are realising about 6½d. out of the gallon. We found here the same system of weighing each cow's milk by itself and of keeping only the best cows for milking purposes, and feeding off the others; but instead of the Swartz system of cooling we had the separator at work, and churning and cheese-making carried on on a large scale. The Danish centrifugal separator is a hollow circular machine, driven at the rate of about 300 revolutions per minute, into which the milk is run. The skim milk, from its greater weight, is thrown to the outside of the circle and there taken off, whilst the cream is caught as it gathers in the centre. By this system, within an hour of being milked, the cream may be separated, leaving in the skim milk a less percentage of butter fat than by any other known process. We found here that the cream of 25lbs of milk yielded 1 lb. of butter and that 14 lbs. of skim milk gave 1 lb. of cheese. The average prices realised were as follow:—Sweet milk 6d. per gallon; butter, 1s. per lb.; cheese, 2½d. per lb. Dairymaids were in receipt of about £4-5s in the half-year and, as at Mrs. Neilson's they presented a clean, tidy appearance, with white caps, coloured frocks and oiled water proof aprons suspended from the shoulders. The greater part of the farm was in crop or hay, 26 horses being used on it. The rotation was something like our four-shift, but no pasture existing a large breadth was in green rye and vetches. To pay the purchase cost, the owner valued his farm at 35s. per acre if leased. There were 8s 6d. per acre of taxes on the place which included everything.

On returning to Copenhagen we took the steamer in the afternoon to Malmo, a town of some importance in the south of Sweden, where we found the same system of agriculture, good soil, and heavy crops. On Tuesday morning we left Copenhagen for Roskilde, a town about 30 miles to the south-west. The country we passed through was undulating, the heights being sandy, and low places peat or marshy: but most of the land good, and bearing heavy crops. As at home, schelloch was a great pest, polluting almost every oat field, and some of them very badly. We visited a Mr. Nilson's farm outside the town, which he rents from a convent at 38s. 6d. an acre. His 26 cows were crossed from the Angeln and Jutland, two native breeds resembling our Ayreshires and shorthorns in their adaptations, but rather larger. They are never outside grazing except for a month or two in the autumn, and the following will show the high feeding practised here, with its results:—In winter the daily mixture for each cow is—5 lbs. bran, 2 lbs. ground oats and barley, 1½ lbs. rape cake, 1½lbs palm nut cake, 1 lb. cotton cake, ½ lb. linseed cake, 1 lb. earth nut cake, 80 lbs. mangolds, 8 lbs. of hay; and all given cold, as they consider warm food very wearing on the cow. In summer it is 2 lbs. bran, 1½ lbs. cotton cake, 1½ lbs. palm nut cake, with as much clover or vetches as they will consume. The average annual yield of milk per cow is 900 gallons. Each cow's produce is marked down on a board, and when they do not give 750 gallons the owner feeds them off. All the dairy buildings are sunk under the dwelling-house, and are very suitable and clean. The byre had four rows across, with the heads to each other; but the roof was too low, and ventilation very bad. The foot walks were formed of round causeway stones, and were rather narrow and dirty, and precautions against sewage filtration were insufficient; but all the crops on this farm were good and clean.

From Roskilde we drove out 6 miles to an agricultural school at Tune, and found one of the most interesting sights we had witnessed since leaving home. There are five teachers connected with it, receiving from £33 to 112 a year It possesses endowments of some land attached, and rents some more. A large quantity of milk is bought from the neighbouring farms and converted into butter and cheese. The students average about 50 during the summer, and 100 during the winter months, but before they can be admitted, must have at least two years' working experience on some farm. Your deputation were very much impressed with the appearance of these young men, from seventeen to twenty-one years of age, and mostly drawn from the class of smaller farmers. As we came they had just risen from that day's lesson on Stilton, Cheddar, and Parmesan cheese-making, and were anxious to learn from us something of that, to them, wonderful country, Scotland. They pay a fee of nearly £2 a month for board, lodging, and education, their term being two sessions of nine months each. The effect of these young men leaving this school to superintend the management of their own farms must be of great consequence to the surrounding district. We found the system of book-keeping very complete, a large black board being kept in the milk-room, with the quantities and products of the different farmers' milk marked in separate columns. They pay the farmer the average price of 1 lb. of butter for every 27 lbs. of pure milk, the average price of their butter per English lb. being 1s. 1½d., and their skim milk yielding them about 2d. per gallon when made into cheese. Our attention was drawn here to the manure pit, which was abutting on the byres, the bottom and sides of which were thoroughly cemented, the liquid manure being led a short distance to a circular tank detached from the offices, roofed, and also thoroughly cemented. From the high feeding which is the rule here, the liquid manure is much valued, and is carefully collected and applied to the land in the spring, or during wet weather in summer or autumn. The Danes, but more especially the Flemings, have been long and justly famed for the care which they bestow on this department of agriculture. On the way back to Roskilde we called in at a smaller factory, managed, it seemed, by a man, his wife, and a servant. We found [illegible] the same system of book-keeping, got the average prices for [illegible] months of the year 1884, which the husband, although a [illegible] practical man, could turn over the leaves of his [illegible] at once. Average price of butter 1*s*. 1*d*. We were also impressed when the good lady of the house turned to our interpreter, and asked us, through him, not to go back to Scotland and make *all* our own butter, as they still wish to have us as customers.

Having thus explored the district so far round Copenhagen, we parted with the interpreter, kindly granted us by James Currie & Co.'s agent, and came on across the Island of Zeeland to Korsoer, stayed there over a night, whence we started next morning at seven, crossed the Island of Funen to Fredericia, then down through the now German Provinces of Scleswig and Holstein, and reached Hamburg about 9-30 P.M. As a whole, there is a sameness about all the land of Denmark; but through Scleswig and Holstein, along our route, was some very poor peat and sand land. Finding no inducement to remain at Hamburg over the night, we left with the 11 P.M. train for The Hague. Almost all the way the land is very flat, even a low hill being seldom seen, and in about thirty hours' travelling we only passed through one short tunnel. Between Utrecht and Amsterdam, the best land for pasture or cropping we had yet seen was passed through, many miles being entirely devoted to pasture or hay. In Holland Proper it was much the same, as all the land is only about 18 inches above water level and under sea level. Small canals go up between each field, with larger ones at the bottom, no fences being used. Cows are never brought in during the summer, all milking being done in the field, a one-legged stool with a handle being used. The crops of hay were very heavy, as one might have expected from the great amount of heat, and the water so close to their roots. A great deal of the hay appears, however, to be rather coarse in quality. The whole country seemed to be what one would call a *beau ideal* one for growing Timothy *pure* crops of which we did not see, although it was sown. Hay was being taken in in boats, and manure out, canals being used for everything. Market gardening was very common. Having arrived at The Hague at 3 o'clock, we went out to visit a Mr. Waldeck, to whom we had an introduction. He has a large stretch of pure white drift sand, and as sand is used on floors on the Continent, he sells it at a low rate, and gets the land, reclaimed at the rate of 2½ acres per year. Land thus reclaimed is free of all taxes for 20 years, and we were told that the crops realised £25 per acre. We are informed here that any poor in the town or neighbourhood were all supported by the Church by voluntary contribution, and when a severe winter occurred greater liberality was looked for, as a matter of course. In this neighbourhood the spell which had held us of the beauty and romance of the canal system was completely broken. The amount of garbage floating on the stagnant surface; the dark, soapy character of the water; and the pungent odours, which did not soothe the olfactory nerves, made us feel that although the district was a rich one, it was not a very enviable one for the spending of a holiday, and the wonder to us was that epidemics did not more frequently prevail.

We started at three o'clock next morning to see a dairy farm of 107 acres, called Jacoba Hoeve. We were informed that this was a rented farm, and the tenant seemed at first scarcely equal in intelligence to the average farmer in our district, farming 100 acres, although he improved upon further acquaintance. The steading here was certainly above the average of those we had been visiting. The byre was a double one with a centre feeding passage 5 feet wide. The stable was also commodious, having good wide stalls, fair ventilation, and we noticed in front of the horses' heads glazed tiles between the manger and heck. A novelty of the piggery was a somewhat rude but effectual contrivance to enable each pig to have its own share of the feeding trough. The water provision we thought rather defective, the well being sunk in the churning room, with only a partition separating it from the byre. We, however, saw a cheap style of water cistern in the corner of the churning room, built of common brick and cemented, and another of the same kind in the pig house for storing feeding stuffs. The milk room was in a sunk flat, and had plenty of water to keep it cool. The milk was cooled on the Swartz system, and the cream ripened and churned, but the quality of the butter, in our opinion, was *not* first-class. The Dutch system of having their milk vessels painted both inside and outside in strong shades of blue was here noticeable, but we thought our own system of scalding and scrubbing a preferable one. The rent here was about 63s 4d an acre, and the farmer appeared to be in fair circumstances, and living in simple style, with his cabriolet to drive his family to church. Having got through Mr. Waldeck, an introduction to a very large farmer at Gouda, we broke our journey there, and drove out, only to be disappointed, as the one young man who, we were informed, had good English was from home, and we could only look on without being able to question; so we hurried back to catch the train for Rotterdam, which we reached at 3 P.M. We found it a very busy town, with much shipping, and some handsome streets and buildings, and, like most other continental towns we passed, we observed in the neighbourhood a large extent of vegetable and fruit farming. From Rotterdam we pushed on to Antwerp, and found quarters in the centre of the city; and considering the flights of stairs we ascended, all of wood, and the bewildering passages we had to perambulate, the thought could not help crossing our minds that if fire did reach us, our only exit would be by the roof. The International Exhibition, like most similar enterprises, was not near completion, although it had been open to the public for some time. In the course of a hurried run through it we noticed the model of a Manitoba Farm, the plans of the Suez and Panama Canals, with sketches of the dredging machinery, and an interesting collection of natural grasses grown there and here. We also saw a very large tree which was discovered last year in the bed of the Rhone, 96 feet in length and 27 feet in circumference at the base, with a gradual taper, and supposed to be 20 centuries old.—*North British Agriculturist.*

DR. AITKEN ON THE DISEASES OF FARM STOCK AND EDUCATION.

The opening address of the winter session of Royal (Dick's) Veterinary College, as we briefly noticed the other week, was delivered by Dr. A. P. Aitken, Chemist to the Highland and Agricultural Society. Dealing with the above subject, the Doctor said:—There is one direction in which, at this time, veterinary scientists are engaged in work of the highest class. I refer to the study of the infectious diseases of animals. The epidemics, or, I should rather say, the epizootics to which our cattle are liable afford a splendid field for investigation, and one whose utility is not confined to the important one of protecting the agricultural interests and the securing of wholesome food for the people, but it has also important bearings on the cure and prevention of like disorders in the human species.

We are all familiar with the means at present used to rid us of pleuro-pneumonia, and such like plagues. It is the rough-and-ready one of 'stamping out,'—a process which is quite effective to prevent the spread of disease, but it is not one which does any credit to our medical skill. I hope the time is near when something more scientific than the wholesale slaughter and burial of healthy herds may be discovered to rid us of such plagues. In the successful combatting with pleuro-pneumonia we may hope to find a clue to measures which might be available for checking the spread of cholera and other epidemics to which men are liable. It is to you whom we must look, with the increased educational advantages which you enjoy, to extend more and more the domain of medical science in directions in which your practice affords you unusual facilities.

I have alluded to the health of farm stock, and that is a subject with which a large number of our veterinary surgeons in the country are chiefly engaged. When we consider that the number of live stock in these islands outnumbers the people, we see how great a field there is for the exercise of veterinary skill. A very large proportion of these consists of sheep whose diseases are usually treated by the shepherds on the hills, and as the result of this withdrawal of sheep from the care of the veterinary surgeon, the diseases to which sheep are liable are not, in many cases, very well understood.

The circumstances of their lives—usually far away on the hills—and the rapidly fatal character of some of their diseases, set obstacles in the way of investigation, so that veterinary surgeons cannot see and study their diseases, and we frequently hear of farmers losing the half of their stock of lambs without calling in any veterinary aid.

It is therefore much to be desired that farmers themselves should be possessed of some knowledge of veterinary science, for until they are able to watch intelligently the symptoms and development of disease in their hill stock, and until they are able to use with precision some remedies, it does not seem that any material advance in the investigation and understanding of these diseases will be made.

It is also desirable that veterinary surgeons should be instructed in the rudiments of agricultural science, so that they may be in a position to instruct farmers in the care of their flocks and herds, with greater authority, and with more special application to their wants and circumstances. The fortunes of a large proportion of the veterinary surgeons of this country are intimately bound up with those of agriculture, so that anything which affects the prosperity of agriculture cannot be indifferent to the veterinary profession

At the present time, as you are all too well aware, the agriculture of this country is in a very depressed condition—the depression has lasted long, and even the most sanguine are unable to say that we have seen the worst of it. The causes of that depression are many and complicated, and by no means perfectly understood. They are, in large measure, the same as those which are producing the widespread general commercial depression that is weighing heavily upon almost all branches of industry at this time, for agricultural prosperity rises and falls in sympathy with commerce. Some of these causes, such as inclement seasons, are only temporary; while others, such as increased foreign competition, are permanent; and the natural result of human progress. It is with the latter only that we have to deal. It is vain to hope—it would be folly to expect—that by any fiscal obstructive enactments we can do anything to protect our agriculture from the operation of those causes which are the outcome of scientific progress—that progress which has within the last few years enabled us to lay our hands upon the ends of the earth. We must expect that the facilities for transit, that have so marvellously increased of late, will go on increasing; and that we shall in the future, even more than in the present, have to compete with the industry and enterprise of those who are engaged in producing the world's food in climes more favoured than our own. In order to maintain a prosperous agriculture against permanent forces, such as these, we must bring to bear upon it the operation of forces which are equally permanent and progressive, and there is no force with which I am acquainted that can be employed to protect, to maintain, and to advance our agriculture, but the great power of education. The superior education of our farmers, and of all who are engaged in the cultivation of our soil and the manufacture of our farm products, must form the bulwark of our agriculture.

It must be confessed that as a nation we have been very remiss in this matter. We have left the special education of our farmers almost entirely uncared for. Private enterprise has been allowed to perform, on a comparatively small scale, the work which ought to have been the duty of the State, and we are only now awaking to a sense of the national importance of this matter when we see other nations outstripping in the race in which we in this country, and specially in Scotland, held the foremost place. The world-wide reputation which Scottish farming enjoyed, we owed to the good elementary education and intelligence of our people, and in great measure to the fostering care of the Highland and Agricultural Society, whose manifold exertions for the good of agriculture have laid the Scottish people under the deepest obligations. But when we consider that a successful agriculture lies at the foundation of our national prosperity, it is evident that the special education and training of our farmers is too important a matter to be left to private enterprise, or to the limited resources of an agricultural society. We see the nations of the Continent and the States of America making agricultural education a large national concern, and we see them organising agricultural colleges and schools by hundreds, and endowing them liberally from the national exchequer, and the result is that agriculture is rapidly rising from the position of an art to that of a far-reaching science; and there is nothing more certain than that, if we are to hold our place worthily among the agricultural nations of the world, we must follow that example—the prosperity of our agriculture must have its foundations laid in our schools.

I have said that the veterinary profession is intimately concerned in the prosperity of agriculture. Foreign nations have recognised that, and they go further than that, and regard veterinary science as a branch of agricultural education, and their great agricultural institutes and colleges, some of which have a revenue of from £5,000 to £10,000 a year, have a thoroughly equipped veterinary school as a part of their organisation. We have nothing to show in this country which can compare with these things. A few years ago the subject of agriculture was included by the Science and Art Department as a branch of education, in which a capitation grant could be obtained, and a small beginning has thus been made towards the encouragement of agricultural education in the elementary schools; but that is only a small beginning. The higher education of our farmers is still uncared for, and left to private enterprise. Let us hope that this matter, so important for our national prosperity, will ere long receive the attention which it deserves. It behoves all who are interested in agriculture—and who is not?—to use their influence to press the subject of agricultural education upon the attention of our Legislature. We hear at present of many schemes for the improvement of the condition of our agriculturists. Some of these have for their object the simplifying of the process of the transfer of land, and the removal of antiquated laws and restrictions which impede the farmer in the cultivation of the soil; these are much-needed reforms, and if gone about prudently and wisely, they will be productive of much good. And we hear of other schemes—foolish schemes—utopian dreams of agrarian reform which have for their object the multiplication of miserable crofts—little patches of land on which an unlimited number of peasants, with neither capital nor the resources of modern invention to aid them, may spend their energies in the vain attempt to compete with science and capital, and so multiply a race of agricultural paupers.

That is the opposite of all that we want—that is backsliding, and not progress. What we want is education—that education which will teach the husbandman what are nature's laws, and guide him to the most economical and productive expenditure of his energies and his resources, and prevent his engaging in an unprofitable course of husbandry.

Let us hope that that end will soon be achieved, but while we are hoping, let us not be idle. We must not stand waiting upo the 'law's delay.' Each one must do what he can to make fo progress in his own way, and according to his ability,—*North British Agriculturist.*

SORGHUM.

DIFFUSION PROVING A SUCCESS.

We have already referred to the interest felt in the outcome of the experiments on a working scale in extracting the sugar from the sorghum cane in Kansas, and the ribbon cane in Louisiana by the *diffusion* process, under the auspices of the Department of Agriculture. The results of these experiments, we said, would demonstrate whether at present prices sugar can profitably be made from the sorghum cane. And they are no less important as regards the sugar cane of the south, since the loss of sugar in milling the canes has been fully as great as in case of sorghum cane at the north. The following letter to the *Rural World* will be read with interest, giving as it does good ground for the belief that the problem is now being successfully worked out in the works of the Franklin Sugar Co., at Ottawa, Kan., by Prof. Wiley, of the department, and his associates:

"I regard the results obtained here as decisive of the northern cane business. The present system of manufacturing cane has brought out in bold relief the difficulties which must be overcome before success can be attained. Low prices and the sharp competition of other products drive us to the use of more economical methods of extracting and better methods of clarifying the juice. Necessity compels the manufacturer to avoid the extraordinary loss caused by rolling cane. The department of agriculture recognizes this fact, and has tested the diffusion process on northern cane on a practical working scale with extraordinary success.

"The Franklin Sugar Co., at Ottawa, Kansas, have immense double mills with rolls closely set, driven by a 150 horse power engine which labors hard producing as dry bagasse as is possi by that method. I was told the cost of the mills, boilers of the grinding apparatus alone, was about $20,000. The mills are speeded to extreme slowness to obtain the largest possible per cent of juice, and yet there is a loss of over 40 per cent of the sugar remaining in the bagasse.

"Saving this large loss means a margin of profit to the manufacturer, and it means the success of the cane business. The diffusion experiment is an effort to save this loss, and it is a successful effort.

"The diffusion apparatus consists of cutters revolving at 220 revolutions per minute, which cut the cane into ten diffusing cells or tanks. The knives are grooved so that the cane chips have no flat surfaces to lie close together, preventing free flow of liquid through the mass. They were designed by Dr. Wiley, and do the work perfectly. One cutter is used, while another is sharpened. The knives are used four or five hours before sharpening. The only difficulty in the experiment has been in the faulty shape of the diffusing cells. A battery built for beet pulp is not suitable for cane chips, because the chips frequently pack in the cells and cannot be readily removed. This can be easily remedied by altering the form of the cells and enlarging the outlets. Dr. Wiley says diffusion is as easily applied to northern cane, and gives as good results as in beet manufacture.

"The battery consists of ten cells, each of these cells holds 1,340 pounds of cane chips, they should hold one ton each. A cell is filled with cane chips and then with warm water, this water is after a short time drawn into the next cell which is also full of cane chips, and so on until all the cells are filled. The first cell has by this time lost all sugar and is emptied, and this process goes continually on, eight cells being always under pressure, and one being filled and one being discharged.

"On October 8, the diffusion battery was operated eighteen and three-fourth hours, the number of diffusions was sixty-seven, the average time of each diffusion was seventeen minutes, the amount of cane in each cell was 1,340 pounds, the total weight of cane diffused was 89,780 pounds, the weight of juice obtained was 95,920 pounds. The extraction of sugar was surprisingly perfect, only traces of sugar were found in the exhausted chips and in the waste water, amounting in all to three-tenths of one per cent of sugar lost. The diffusion juice average ten per cent of total solids, of which six per cent was sucrose, two per cent glucose, and two per cent solids, not sugar. The total weight of coal used from 6-30 A.M., October 8, to 6 A.M., October 9, was 3,276. This gave the steam used for driving the apparatus and for heating the liquid in the diffusers. The weight of coal used in working a ton of cane was sixty-five pounds, worth here ten cents.

"Four men were employed on the cane carrier by day and four by night, at $1·25 each—$10·00; four men operated the diffusers by day and four by night at $1 25 each—$10; two firemen at $1·50 each—$3·0; one boy at 75 cents—75 cents, costing in all $28·75, or 57 cents per ton of cane worked. There were annoying delays caused by the faulty shape of the cells, and with a battery properly constructed it would cost no more to diffuse 150 tons of cane in the same working time.

"Prof. Swenson, the superintendent of the Franklin Sugar Works, and Mr. Parkinson, the managing director, whose opinions I value because they have had the largest practical experience in working cane, both unhesitatingly say that diffusion is a success. They want no more mills; they say diffusion juice is more easily defecated. It costs less for power and for apparatus, there is less danger of breaking the machinery, that nightmare of the cane business, and a break would be much less serious than a break in a cane mill. The application of diffusion to northern cane is a long stride ahead.

Diffusion is not the only successful experiment which has been tested by the Department of Agriculture. Carbonatation is a brilliant success. The diffusion juice is mixed with about one and a half per cent of lime, it is then run into a tank containing a steam coil and also a perforated pipe, which is connected with a lime kiln by an air pump. Carbonic acid gas, produced by heating lime stone, is forced through the juice, until the lime which was added to the juice is converted into the carbonate of lime, which rapidly settles and brings the impurities to the bottom. It was wonderful to see the effect of this process, the juice becomes limpid and sparkling and has just the right tinge of color. I saw carbonated juice, and the same juice uncarbonated boiled in an open pan to syrup, side by side; there was money and satisfaction in the carbonated product, there was neither in the other. Carbonation so purifies and cleanses the juice that heat has less injurious effect. I heard the manager of the sugar company say that the process was worth $100 a day to his company. I heard the superintendent of the sugar company say, "Now there is money and pleasure in the business." I heard Prof. Hart, the assistant superintendent, say, "It saves the 20 per cent loss usual in skimming and waste, to say nothing of the quality of the product" I heard a Chicago capitalist, who is looking for a location for a sugar factory, say, "Diffusion saves 41 to 50 per cent of the juice. Carbonation saves 20 per cent of the loss in waste, and increases the value of the product. I can make sugar without any tariff." I heard employés of the sugar company say, "it is fun now to work extra time, for we are making good goods and money for the company." I send you a sample of the precipitate from the carbonated juice, the latter contains all the impurities removed from the juice, and as it can be washed there is no loss, as is the case in skimming.

"This experiment has been made with the cheapest and rudest apparatus, but it has been tested on a large working scale and there is no part of sugar manufacture more worthy of further trial. If some modification of this process can be adapted to smaller factories, there will be an advance all along the line, and the northern cane business will immensely improve the quality and immensely increase the quantity of its products.

"Mr. J. S. Spencer, who has studied the process in beet fac[illegible] and who, I am told, was sent by the Department to Europe [illegible] has had charge of this experiment.

"It should be remembered that there is nothing new, nothing empirical about diffusion of carbonatation, both have been used in the beet business for many years. These processes are simply transferred from one industry to another, and the Department of Agricultures has demonstrated their adaptability to northern canes, not only by laboratory experiments, but also by satisfactory tests on a large scale, and the much less room for doubt than if they were new discoveries.

"The Department of Agriculture deserves the thanks of the cane growers and manufacturers and of the country. It has rescued a struggling business, and the results will benefit the country. In all this western country cane is easily produced in any quantity. The success of cane depends on using proper methods of manufacture, and by expensive experiment the department has improved the methods.

"Dr. Wiley has been ably seconded in the work here by his assistants, Messrs. Richardson, Spencer and Dugan, of the division of chemistry of the Department of Agriculture, Washington, D. C., and also by Prof. Scovell, and by Mr. Forsythe.

"All have shown enthusiasm and energy and disregard of extra or night work and anxiety for results. I have seen the manager of the sugar works carrying cane to the diffusion cane carrier at midnight, when help was wanted, and heaving limestone into the lime kiln and enthusing everybody.

"I am told Dr. Wiley is a graduate of medicine, an accomplished musician, an able journalist and chemist. He seems also to be a mechanic; an engineer, and to have a good executive ability, and yet he is scarcely forty. I asked him why he was and old bachelor, and he said it was because his girl said, "Pass those molasses please." I am always asking foolish questions, and sometimes I do not get correct answers. I nervously retract all I have said about 'henetudinosity,' and 'archæology' because he is saving sorghum. Good work has been done and good results have been obtained at Ottawa.—A. A. DENTON,—*Farmers' Review.*

LAND UNDER TEA IN ASSAM.

LAST year there were only 15 applications under the Waste Land Rules of 1876 for land required for tea cultivation in Assam, which shows a considerable falling off as compared with previous years. It must however, be remembered that a very large number of the applications generally come to nothing. In fact, the area granted last year on 13 out of the 15 applications was 3,103 acres, as compared with 2,045 acres on eleven grants in the previous year. Altogether, excluding grants resumed and resigned, there are at present in the Assam Valley 475 grants under the above rules, covering 167,683 acres, and paying land revenue amounting to Rs. 48,546. More than one-fourth of this acreage is in the Naugong district, but lately the applications for land have become more numerous in Darrang, Sibsaugar, and Lakhimpur. Under recent orders issued by Mr. Elliott, applications for waste land under the rules of 1876 must now be limited to 600 acres whereas the former limit was 1,500 acres. Waste land for tea cultivation is also still taken up under the ordinary Assam Settlement rules, and last year 193 decennial and 23 annual leases, covering a total area of 20,298 acres, and paying a revenue of Rs. 15,529, were issued. It appears, however, that it is contrary to the standing orders to issue annual leases to tea planters, but the Commissioner of the Assam Valley explains that much leases still continue to be issued, because there has been some difficulty in getting the lands applied for surveyed, and that such annual leases will be converted into decennial leases when the lands have been properly surveyed and boundary marks have been erected. This excuse does not satisfy that Chief Commissioner, who is of opinion that there should be no greater difficulty in getting lands surveyed under the Assam Settlement rules than there is in the case of lands applied for under the rules of 1876. It has, therefore, been decided that the issue of annual leases to tea planters must cease altogether, and applications for lands for tea under the Settlement rules must be treated as pending until the land has been actually surveyed and the decennial lease issued. The planters would, therefore, do well to bear in mind that an essential difference exists between an annual and decennial lease, or when the land revenue regulation comes into force, he may find that an annual lease confers upon him no valuable property in the land he occupies. Altogether there existed at the close of the year, in the Assam valley, 542 decennial and 290 annual leases, covering a total area of 76,937 acres, and paying Rs. 1,18,665 as revenue. This gives an increase of 19,160 acres of land granted for tea cultivation since the year 1881 82; and shows that, notwithstanding adverse circumstances, steady progress is still being made in the demand for tea land. Up to the close of last year there were in existence altogether 1,853 grants or leases, covering 5,09,051 acres, issued under the different Waste Land Rules that have from time to time been in force in the province, and also under the ordinary Assam Settlement rules. Of this acreage the largest area, 3,33,008 acres, is held under the redeemed old rule grants or in fee simple.—*Englishman.*

HOLLOWAY'S PILLS.—Epidemic Diseases.—The alarming increase of deaths from cholera and diarrhœa should be a warning to every one to subdue at once any irregularity tending towards diseases. Holloway's Pills should now be in every household to rectify all impure states of the blood, to remedy weakness, and to overcome impaired general health. Nothing can be simpler than the instruction for taking this corrective medicine, nothing more efficient than its cleaning powers, nothing more harmless than its vegetable ingredients. Holloway's is the best physic during the summer season, when decaying fruits and unwholesome vegetables are frequently deranging the bowels, and daily exposing thousands, through their negligence in permitting disordered action, to the dangers of diarrhœa, dysentery, and cholera.

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Health, Crop and Weather Report.

[FOR THE WEEK ENDING 16TH DECEMBER 1885.]

Madras.—General prospects fair ; continue favourable in Bellary and Anantapore.

Bombay.—River still low in Sind. Slight rain in most districts of the Deccan and in parts of Bijapore, Belgaum, and Upper Sind Frontier ; more wanted for *rabi* crops in parts of Nasik, Ahmednugger, and Khandesh. Reaping of *kharif* and sowing of *rabi* crops nearly completed in most districts ; standing crops damaged by drought in two talukas of Khandesh, by blight in one taluka of Dharwar, and by blight and insects in parts of Bijapore. Cholera and small-pox in parts of three, cattle-disease in parts of twelve, and fever in parts of fifteen districts.

Bengal.—Rain reported from almost all districts of Behar, and from Dinagepore, Rungpore, Burdwan, and Hazareebagh. In Behar and Hazareebagh it has greatly benefited the *rabi* and poppy crops. *Aman* harvest is generally yielding a good outturn, except in the parts of South-West Bengal deeply inundated in August and September. Price of rice is generally lower than last year, and it has further fallen in several places during the week with the appearance of new rice in the market. Public health continues generally fair.

N.-W. Provinces and Oudh.—Rain has fallen in all reporting districts but one, and has benefited the *rabi* greatly. Prospects are good. Supplies are ample and prices generally steady. Public health is good.

Punjab.—Moderate rainfall in a few districts, more wanted. Health generally good. *Rabi* sowings approaching completion. Prices fluctuating.

Central Provinces.—Rain has fallen and cloudy weather prevails in all districts, except Sumbulpore. *Rabi* crops improved ; *juari* slightly damaged in Nagpore. Fever in parts Prices steady.

British Burmah.—Cholera slight in five districts, elsewhere public health good ; cattle disease slight in eight districts, elsewhere health of cattle good. Crop prospects good in all districts except in Tharrawaddy and Prome, where the crop is fair, and in Thayetmyo, where it is poor.

Assam.—Weather seasonable. Public health fair : cattle-disease in some mouzahs. Reaping of *sali* being continued ; gathering of *matikalai* and *mugh* in some villages commenced. Crop prospects very fair. Cholera reported in some parts of the district. Common rice 16 seers per rupee ; tea season closed.

Mysore and Coorg.—Weather cloudy. Fever prevalent in parts of Bangalore, Tumkur and Shimoga ; cattle-disease in parts of Shimoga and Kolar. Standing crops in good condition. No material change in prices. Prospects of season and public health good.

Berar and Hyderabad.—Weather rainy. Rainfall has somewhat injured cotton and *jowari* crops ; *rabi* in good condition ; prices in Amraoti —wheat 22, and *jowari* 26 seers per pupee. *Abi* crops prospering ; harvesting of *kharif* crops continues in some places. General health of taluka fair ; fever has disappeared. Prices in Hyderabad—wheat 14½, coarse rice 12¾, white *juar* 20½, yellow *juar* 27½, and *tur* 15½ seers per current sicca rupee.

Central India States.—Weather cloudy and cold ; and except for a few drops of rain in Indore, there has been none elsewhere. Health good. Prospects of crops much improved. Opium prospects fair. Prices steady.

Rajpootana.—Weather very cloudy ; nights frosty. Fever still prevalent. Except in Meywar, Sirohi, Pertabghur, and Kerowli. Tanks and wells fair. Crops average. Small-pox slightly prevalent. Prices stationary. Health and crop prospects good. *Kharif* crops being gathered. *Rabi* sowings nearly completed. Prices in Pertabgurh—wheat 20½, *mukka* 31, and gram 37 seers per rupee. Outturn of *kharif* in Kotah much below average. Fever and slight small-pox prevalent in Ajmere. Crops germinating in Bhurtpore.

Editorial Notes.

OUR readers will remember a short time back the paragraph we published regarding the ensilage experiment carried out at Allahabad during 1884-85. At that time we had only been furnished with a statement showing the number of silos made, the quantity of fodder and grass silaged, and the cost of the experiment. We have now before us an interesting memorandum drawn up by Captain S. C. F. Peile, Assistant Commissary General, embodying the practical results of these experiments. The memorandum, which is of sufficient interest in itself to repay perusal, will be found elsewhere.

⁂

UP to last week the reports of the brokers stated that the total quantity of indigo out of the market was 50,000 maunds against 38,500 maunds last year. Of the above quantity, about 11,000 maunds were Bengal, 21,700 Tirhoot, 4,500 Benares, and 12,800 Oudh. The demand for good and fine indigos has not been so keen, and the prices for these qualities are quoted from 5 to 10 rupees lower. But on the other hand ordinary to middling have realised fully previous rates : whilst Oudhs generally are rather dearer.

⁂

WE understand that the honorary title of " Commissioner for India " has been conferred by the Royal Commissioners on Mr. E. C. Buck, in recognition of the work performed by the Revenue and Agriculture Department in India in connection with the Indian courts at the forthcoming Colonial and Indian Exhibition. The title is of an honorary character, and carries with it no duties or responsibilities outside India. The statement which we recently made that Mr. Buck proceeds home on furlough and not on duty connected with the Exhibition is therefore, notwithstanding the conferment of the above title, absolutely correct.

⁂

IN October last a proposal was made regarding the desirability of establishing experimental botanical gardens at Gudalur, Kuttalum, Russellkonda, Hospet, Ramandrug, Yercaud, Chittoor and Palmaner in the Madras presidency, and Mr. Lawson, the Director of chinchona plantations, parks and gardens, Nilgerris, was called upon for any remarks he may have to make upon the subject. His report is an interesting one, and will be found elsewhere. The Government of Madras consider, however, that to begin with, it will be sufficient to establish gardens at Gudalur and Kattalum, under the management of trained overseers. Mr. Lawson has been requested to visit Ramandrug and Yercaud, and to report after inspection in which of these localities he would propose to establish gardens.

⁂

THE same paper has the following remarks on the sugar market:—

The more favourable tone of the foreign market during the last few days has strengthened the tendency of prices, the quotations showing an advance, so that the present aspect of the market is much more favourable than it has been. A further improvement is also expected, since the total production of Europe is, according to the latest calculations, much less than was thought. The deficit in Germany is estimated at 18 per cent, in Austria 40 per cent, in France 25, and in Belgium 33 per cent. According

So these figures the production of Germany is taken at 9·7 million metercentners, that of Austria 3·6 millions, and that of the four countries named 19½ million or 5½ million less than in 1884-85. The Zucker-raffinerie Brunonia manufactured during the business year 1884-85 84,900 centners of raw sugar, against 80,633 centners in the preceding year.

⁂

WRITING on the subject of the jute industry in Germany, *Kuhlow's Trade Journal* says:—

In order to learn with certainty whether over-production prevails in the jute market the manufacturers in this industry have just procured statistics from the Imperial Statistical Office. From January 1st to June 30th, 1885, the imports of unbleached, undyed, and unprinted jute and Manilla hemp yarn within the German customs district were 9,966 doublecentners of 100 kg. and those of the bleached, dyed, and printed jute, &c., yarn were 226 doublecentner, together 10,728 doublecentners or 1,072,800 kg. Of jute and Manilla hemp stuffs 14,289 d.c. or 1,428,900 kg. were imported. The imports of jute sacks are estimated at 1,693,000 kg. The imports of jute, linen, and hemp yarn up to No. 8 English were up to the end of August 1,211,200 kg., those of jute, linen, and hemp yarn between No. 8 to No 20, 4,428,400 kg., and of jute and Manilla stuffs, as well as linen, ticking, and huckaback up to 16 threads to 4 square centimetres surface 2,190 600 kg. From 17 to 40 threads 894,900, kg., together 3,085,500 kg., or 30,855 doublecentners.

⁂

THE Melbourne trade returns show symptoms of a healthy revival. During the four weeks ending on the 17th of November, as compared with the corresponding period of 1884, the imports showed an increase in value of £197,554, and the exports of £417,933. The largest increase in imports was in tea, which improved to the extent of £114,298. There was also an increase in the value of sugar, spirits, wine, tobacco, iron, and timber. An increased export of gold more than accounts for the whole increased value of exports; for this is put down at £495,346. On the other hand, there was a large decrease, not only in the value, but in the quantity of wool exported. The total export of gold from the 1st of January to the 14th November this year is valued at £3,768,542, showing an increase of £1,660,446 over the corresponding period of last year. On the other hand, the decrease of the value of merchandise exported during the same time represented £1,846,375.

⁂

IT is satisfactory to note that the exports of tea from Calcutta to Great Britain are steadily increasing. The exports in November amounted to 11,644,612lbs., the returns for the corresponding months of the two preceding years being respectively 9,390,037lbs. and 7,140,887lbs. The total exports from the 1st of May to the end of November were 47,730,072lbs. The trade with Australia shows an even more remarkable development. Up to the end of November the shipments amounted to 1,384,784lbs.; the quantity in 1884 being only 577,518lbs., and that in 1883, 206,536lbs. There is also an improvement in the trade with America, although the exports to that country (70,946lbs.) are considerably below those of 1883. Altogether there is an improvement in the trade up to date, as compared with last year, of nearly five million pounds. The Ceylon trade is also advancing with rapid strides, the figures for the past three years (from 1st October to 19th November) being 101,286lbs., 193,869lbs. and 471,402lbs. The exports from India to England include 534,217lbs. that were lost in the steamers *Indus* and *City of Manchester.*

⁂

A TELEGRAM from a Madras correspondent of the *Times of India*, dated the 17th instant, states that "an extraordinary advance has taken place in London in the value of the shares of the Mysore mine, due, according to the *Mail*, to the development of a true fissure vein which it is confidently anticipated must continue through the Ooregum, Nundydroog and Balaghat properties, and so large a mass of rich quartz is available that it may take a century to exhaust the yield. The gold in the Mysore mine has averaged four ounces per ton from June last year, when the month's outturn was fifty-two ounces to last month, when the outturn was one thousand and ninety-six ounces. During the eighteen months the yield has aggreegated six thousand and ninety-nine ounces. The present month's yield will be at least as great as November's. The reef has been traced to a depth of 250 feet. The stone increases in richness with the increase of the depth of the mine. Actual transactions have taken place in Ooregum in London at twenty-five shillings. The quotation for [illegible] Consolidated is thirty shillings. There are rumours of negotiations for resuming work on or acquiring blocks of other companies on the field."

Although a too implicit reliance may perhaps not be placed upon these brilliant anticipations, yet it is a satisfactory feature in the gold-mining industry in Southern India that something has *at last* "turned up" which gives fair hope that it is possible to prosecute the search for the precious metal with some prospect of success.

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THE following is the memorandum on the prospects of the cotton crops in the Bombay presidency, for the month of November:—*Sind*—Area sown 56,000 acres,area up to average, but 17,000 acres less than last year; field inspections not completed. *Gujrat*— Weather seasonable; plants flowering. *Native States* — Baroda — Returns incomplete; Kattiawar — area 1,775,000 acres: in other States area 300,000 acres; these figures must be received with caution; average area unknown. *Deccan*—In Khandesh picking in progress; crop patchy but excellent in parts, in others much of the sown area has been re-sown with other crops, rest of Deccan crop less forward. *Bombay*—Karnatic—Season late; east winds have set in, but as yet little damage reported. On the whole the area sown in British districts is 325,000 acres below average and 300,000 acres below last year's area. In Native States, exclusive of Baroda, the area sown is 100,000 acres above last year's area. Total area British districts 1,950,000 acres; Native States, besides Baroda, 2,225,000 acres.

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THE following is the first report on the prospects of the Wheat Crop in the Bombay presidency:—*Sind*—Returns not received. *Gujrat*—Area everywhere less than last year, except in Surat, and below average except in Broach and Surat; decrease due to insufficiency of late rains; area 250,000 acres, or 100,000 acres less than six years' average, and 125,000 acres less than last year's area; condition of young crops good; slight damage in Broach from cloudy weather in November. *Native States*—Returns incomplete. *Deccan*—Area 950,000 acres, or 125,000 acres above average and 100,000 acres above last year's area; increased area due to rain being unseasonable for early crops; young plants healthy; heavy dews or else showers looked for to bring the crops through, especially in Khandesh and Nasik. *Bombay*—Karnatic—Last year abnormally large and unfruitful area, this year area nearly 400,000 acres or 50,000 acres above average; the increase is merely nominal, because the *jowari* crop was sown more extensively; plants healthy; cold weather has come seasonably. *Native States*—Area 75,000 acres, or about average, though 25,000 acres less than last year's area.

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IT will be remembered by many of our readers that last February a very successful agricultural show was held at Doomraon in the district of Shahabad. With a view to keeping alive and stimulating the interest that was then aroused amongst all classes of the people, the prospectus of a second show in the same district is now announced. The Government of Bengal has sanctioned the contribution of Rs. 2,000 from the divisional Exhibition Fund, and the Director of Agriculture has promised a grant of Rs. 500, while with their usual liberality, the Maharaja of Doomraon and the firm of Messrs. Burrows, Thompsen, and Mylne have each subscribed Rs. 500. It has been arranged to hold the show on the 4th March next, simultaneously with the great cattle and horse fair at Barahpore, two miles from Raghunathpore on the East Indian Railway. The committee intend to hold trials of the simplest and most effective improved ploughs, and to establish a depôt at the show for the distribution and sale to cultivators of samples of selected seed of staple crops. It is particularly hoped that the hand-

some prizes offered for cattle will tempt breeders to send exhibits from a distance.

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We have stated before that the jute mills had at last finally agreed to reduce work to four days per week, the Hooghly Mills alone refusing to become parties to the arrangement. With this one exception, the Mills are we learn unanimous, and the Association has resolved to adopt the measure without further reference to them. However little the Hooghly Mill agents may suspect it, they are moving directly counter to a growing conviction which repudiates the economic theory that was so long permitted to outrage the instincts of the human mind, that self-interest and 'the survival of the fittest' are the last word that political science had to pronounce upon this subject. A truer insight is teaching the leaders of thought everywhere, to repudiate the hateful theory that the controlling principle of every man's relations with his fellows, should be the calm unfaltering pursuit of his own interests. There were never wanting those who refused to bow the knee to this Moloch, and the repudiation of its degrading worship is daily eliciting sharper emphasis from the students of social science. It is happily dawning upon political economists themselves, that the simple Christian morality which requires us to "Look not every man upon his own things, but every man also upon the things of others" has somehow or other, the force of natural law upon men's relations with each other everywhere, and that to repudiate it as the older economists have unwisely done, means the eventual destruction of social order and well-being.

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We say this because we understand that the agents of the Hooghly Mills state frankly their conviction that the common action in which they are asked to join, is a departure from those principles of political economy upon which the welfare of society depends. They no doubt believe so sincerely, and can readily find corroboration of their view in the economists of the last generation, but political economy is a comparatively new science, and its so called 'principles' are now passing through a crucible, from which the dross is being discarded. Amongst this dross, we find this principle of pure self-interest as the rule of action, unhesitatingly repudiated as economically unsound, as it was ever instinctively felt to be repellent. It is an invidious position for the agents of the Mills to occupy, as they themselves say, and a position they would like to abandon, if but convinced that they would act rightly in doing so. We have no right to ask them to take our verdict upon the matter, but we think we may assure them of this, that they will find no leading writer of the present time supporting the principle which they think themselves bound to vindicate in the public interests, at the cost of much odium to themselves. They would find that there has been a gradual but great change of views on the subject, and that the answer to their enquiry would be that their action is *not* in accordance with modern thought on the subject, but must be regarded as of an order that would prove fatal to society if it were universally adopted.

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The following is a summary of the health, crop, and weather reports for the week ending 16th December 1885 :—During the week under report rain has fallen generally throughout the Madras presidency, the Berars, the Central Provinces, and the North-Western Provinces and Oudh. Slight rain has also fallen in Mysore and in a few districts in the Punjab, Bombay, Bengal and Assam. From one or two places in Central India and Rajputana slight showers are also reported. The standing crops are generally in good condition in Madras, and those which are being harvested promise an average outturn. In Bellary and Anantapore prospects continue favourable. In Mysore and Coorg crops are good. In parts of the Bombay presidency more rain is wanted for the *rabi* crops, the sowing of which has been nearly completed in most districts. The *kharif* harvest is nearly over. In the Berars and Hyderabad the *rabi* promises well, and in Central India and Rajputana agricultural prospects are generally good. In the Central Provinces the *rabi* crops have been improved by the recent rain : the *kharif* is being threshed in Jubbulpore and Seoni. More rain is still wanted in the Punjab for the *rabi* crops. In the North-Western Provinces and Oudh the *rabi* crops have been much benefited by the recent rains, and prospects are good. In Bengal the recent rain has greatly benefited the *rabi* and poppy crops in Behar and Hazareebagh ; the *aman* harvest is yielding almost a good outturn except in the inundated tracts. In Assam the prospect of the season continue good. In British Burmah the rice crop is being reaped and promises well in all districts except Tharrawaddy, Prome, and Thaetmyo. The public health is generally good. Prices are fluctuating in the Punjab, and are falling in Coorg. In Bengal the price of rice is lower than last year. Elsewhere prices are fairly stationary.

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Horticulture and husbandry at Erfurt, Prussia, seem to be labouring under most unnecessary restrictions imposed by the laws relating to the vine lice. A German contemporary informs us that the Erfurt Chamber of Commerce, in a report upon the wholesale horticultural and general husbandry industry, says that, notwithstanding a good harvest, the results are not so satisfactory as was expected. The causes, it is said, are to be found in very depressed prices, which often did not cover the costs of production, a less sale, and slack trade in general. The fall in prices was chiefly noticeable in the cole seed carrot seed, green leek seed, early salad, celery, Swedish and autumn turnips, beet-root, radishes, pease, kidney beans, and grass seeds. There was an increase of prices for onions and cucumbers, but the yield was less. There has been a good harvest of most kinds of flower seeds, and only in a few cases is there a failing off, but as a set-off, prices have fallen very low. The plant trade suffers more every year through the restrictions imposed by the laws respecting the vine lice. Gardeners throughout Germany complain bitterly that of all the countries which have joined the Berne convention for combatting the vine louse, Germany is the only one which is less favourably treated by its own authorities than it is by the authorities of other lands. In France, Belgium, and Holland every husbandman can import plants, with the exception of the vine from abroad if they are not condemned by the experts on the frontier, but such plants cannot be sent to Germany without encountering serious difficulties on the frontier. For instance, plants which have come to Germany from Brazil are sent back again, and only with the express sanction of the Government authorities is their importation possible. It is satisfactory to note that the business with all countries—and especially with England and the United States—in dried flowers and grasses is increasing.

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Great efforts are being made to have Indian tobacco properly represented at the forthcoming Indo-Colonial Exhibition. There is no doubt that once fairly launched, Indian tobacco will make its own way in the European markets. With regard to the arrangements made by the Government of India, it appears that, before the idea of a separate tobacco room in charge of Messrs. H. S. King and Co., had been mooted, arrangements were being completed to obtain for the section of the Imperial Economic Court devoted to narcotics, a collection of Indian tobacco, raw and manufactured, which would have included commercial or trade samples contributed by Agricultural Departments or offered by private growers and manufacturers. But that when Messrs. H. S. King and Co's proposal to have a separate tobacco room was put forward, the Government of India, recognizing the advantages it offered for pushing the Indian tobacco trade, sanctioned it and modified its own arrangements. Messrs. King, Hamilton and Co., of this city, being agents of the London firm will therefore have the entire responsibility of collecting and despatching samples, the Government of India being prepared to render any reasonable assistance in the equipment of the tobacco room by making known their (Messrs. King's) arrangements and requirements through the various local Governments and administrations. We take this opportunity of stating that Messrs. King and Co. will be prepared to take large quantities of tobacco ; and in the case of samples suited for European consumption, would be prepared to receive a continuous supply from manufacturers for sale throughout the Exhibition.

In spite of bad trade and greatly reduced profits, the British production of coal shows an increase of 31,000,000 tons, or about 23 per cent in the five years ending 1883, the out-put in the last-named year being nearly 164,000,000 tons, This wonderful progress has been established against the repressing influence of the most severe depression in prices that trade has ever known. That this almost universal depression has not slackened the coal exports from the United Kingdom, is clearly shown by the demand abroad increasing for the British mineral during the years 1884 and 1885. France is England's best customer, taking from our mines something like 4,000,000 tons per annum. Italy follows the Republic with a little under 3,000,000 tons; Germany, on the whole, absorbs nearly the same quantity, while Russia and Northern Europe collectively take considerably over 4,000,000 tons. Spain, Egypt, and India consume each more than a million tons, and we believe that the Indian figure would be fairly represented by 100,000 tons per mensem or 1,200,000 a year. The foreign demand for British coal advanced from 11¾ millions in 1870 to 14½ millions in 1875; and it is expected to attain 31 millions of tons in the present year, 1885. These are startling figures for those political economists who forecast the final exhaustion of British coal resources. This home consumption is increasing, as well as the foreign export: and to meet these demands, the output must keep pace. We are glad to see that this is not accomplished by an extra drain on the old working, but by new undertakings. Speculation continues to hold good that possibly coal may be found in Kent and Surrey. There can be no doubt that the coal-fields of India, China, Borneo, and Australia, will in the future almost entirely dispense with the necessity for export to meet the requirements of the steamers engaged in British trade in far distant waters; while nearer home, present customers are likely to be independent of extraneous indent, and able to meet their own wants from local or nearer sources of supply.

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A short time ago we noticed the offer made by the proprietors of the Nilgerri Brewery to purchase locally large quantities of barley if the cultivators (Badagas) would undertake to grow it on the hills. The brewery people were advised by the Madras Government to import the seed from home and distribute it amongst the Badagas, who it was thought would gladly enter into contracts to supply the demand of the brewery. We now learn with satisfaction that with a view to assist the brewery company in procuring grain for malting purposes, the Government of Madras have sanctioned a proposal of the Director of Agriculture and Settlement to procure 80 bushels of barley from England for distribution among the ryots of the Nilgerri district This is to be treated as an advance made by Government for cultivation, and recovered as an arrear of revenue under section 53 of Act II of 1864 (Madras). Mr. Burrows, the Collector of Nilgerris, in submitting his proposal, stated that he trusted by means of a little wholesome pressure to induce some of the Badagas to take the seed, and the knowledge that they have to pay for it, will probably act as an incentive to more care in cultivation than is usually bestowed on seed given gratuitously for experimental purposes. He added, and very rightly too we think, that the Badagas should not be required to furnish any information about their crop, as this requirement puzzles and frightens them, and makes them regard a supply of seed from Government for experimental cultivation as a pure misfortune; that he himself would keep a watch on the persons who take seed and obtain information as to the results in a general way. In these views the Director of Agriculture entirely concurs, and we agree with him in thinking that if the attempt succeeds, the result will be very much to the benefit of the cultivators, the Brewery Company, and ultimately to that of Government also, as it will tend to cheapen beer. The stake is certainly not likely to be a large one, and we think there is a fair prospect of a gain to all concerned. Mr. Burrows, the Collector of Nilgerris, certainly deserves credit for initiating a new departure in this connection, and we hope that he will not be removed from the Nilgerris district before he has had opportunity of carrying out his programme.

The weighment of Indian Tea is to undergo modification, and the following circular issued by the Assistant Secretary to the Indian Tea Association, will doubtless be read with interest by those engaged in the Tea industry:—

I am desired by the General Committee to hand you copy of a General Order No. 65 1885, dated the 9th November 1885, which has been issued by the Commissioners of her Majesty's Customs, and which contains revised regulations for ascertaining the weight of Indian Teas on importation into the United Kingdom. The Secretary of the Indian Tea District Association of London, in a Circular issued from his office, says:—"With reference to Clause 2, I desire to draw the special attention of Managers of Tea Estates to the importance of careful bulking and weighing at the Gardens. The satisfactory working of the regulations depends entirely on accuracy in these respects. It is also desirable that the tares of the packages of each break should run as even as possible as any great variation in this respect gives rise to suspicion on the part of the Customs and the Trade, and may lead to the whole of the Teas being turned out." I am to add that information has been asked for as to the nature of the statement required to be given by Importers of Tea under Clause 2 of these revised regulations.

General Order 65, 1885.—Custom House, London, 9th November 1885:—

Sir,—I am desired by the Board to acquaint you that in consequence of representations made to them on behalf of the Indian Tea Trade, they have approved of the following regulations for ascertaining the weight of Indian Teas on importation in lieu of those laid down in General Order 5 1884, which is hereby cancelled, *viz*:—1. The packages on arrival to be weighed to ascertain the gross weight of each package. 2. The Importers to give with each entry a statement that the Teas in each break have been bulked in India and that the chests of each break contain even net weights. 3. In order to test the accuracy of this statement, ten per cent of each break to be turned out and weighed net, but in no case are less than three chests to be turned out. 4. If the variation in weight of the test packages, from each other, be found to exceed two pounds, the whole parcel is to be tared. For instance, if the test package weigh net 79, 80, and 81 lbs. respectively, the variations would not exceed two pounds; but if one package be found to weigh 79 lbs., and any other 82 lbs., or more, than the whole break to be tared; unless the Importer and Surveyor consider that an average tare can equitably be given, in which case the tarers must not vary more than two pounds, as in the case of the net weights. 5. Duty is to be charged on the average weight of the packages weighed net, provided that when the average of the packages weighed net amounts to so many pounds and a half or more, the half or more will be charged as a full pound; when the fraction is less than a half it may be disregarded. 6. All Indian Teas bulked in this country are to be weighed gross and each chest tared. I am to add that the Importers are to be allowed the option of having Teas dealt with under the above regulations or under the general regulations on this subject laid down in General Orders 19 1881.—H. Murray, Secretary.

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Dr. Bonavia has addressed the following interesting letter to the Conservator of Forests, Northern Division, Madras, on the subject of obtaining for experiment seeds of the fruit-bearing date-palm of Arabia (*Phœnix dactylifera*) to be sown in the Southern presidency, where planting of the common date (*Phœnix sylvestris*) and the Palmyra on the banks of rivers in the Cuddapah district has already been commenced:—

When I got offsets for the Lucknow gardens I got them through Government and the *Resident* of the Persian Gulf. If you write at *once* you may get them in November so that they may strike by the beginning of the hot weather. Getting them in the hot weather would entail greater loss. They should be got really in *October*. Then with ordinary care and watering more than 50 per cent will strike. In the hot weather they should be watered frequently and kept in the nursery, on the *east* side of trees for shade until the next rains. At the same time I got mine, 100 offsets were sent to Bangalore. They planted them out and neglected them. They all died. They thought, being a desert tree (it is never found in what is really called desert), it required no water! Of my offsets I saved 50 per cent and more; there are in Lucknow gardens 112 date palm trees from *offsets* and 252 raised from seeds, all from thirteen to sixteen years of age and fruiting. Some of them are 12 or more feet high. I am satisfied that the date palm is the famine tree for India. It thrives, lives and *luxuriates* when rain is abundant and even tropical (drainage necessary at the roots), but it gives its *best crop* in times of famine. People think that, because its fruit when ripening rots in the monsoon, it is not suited to this climate. But this year *even rice* rotted in Bengal, and even jowar and indigo rotted. *Ergo* these are not suited to this climate! I feel confident that natives will not allow the dates to rot, as they are very good to eat in their un[illegible] "kharak" stage, yellow or red. Persians live on *kharak* and *fish*. As it is getting a little late for offsets, you had better only ask for 100 this year and gain experience, and then next year go in for 1,000 and then 2 or 3,000 a year to reach you not later than 15*th October*. As to seeds, *this* is the season to write for them also through Government. The date crop is gathered now both in Persian Gulf and in Sindh and Moultan The latter date is *small*, but excellent for famine purposes. You should get maunds of seed of the *best varieties*. Thacker, Spink and Co., of Calcutta, have a book of mine in the press—"Future of the Date Palm in India." It gives every information you may require about the cultivation of this tree and other information connected with it. If you write to them, they will send you a copy as soon as issued. *I have no interest* in its sale. I made a present of the manuscript to the publishers *pro bono publico*. If you get seeds *now*, you will gain a season; 99 per cent of the date seeds *germinate*. Care required during first years.

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From the Resolution of the Board of Revenue on this subject, it appears that date plants were put out in Tanjore so far back as 1880 and 1881, and were obtained from Messrs. Gray, Mackenzie and Co., of Bussorah. These are said to have arrived in good condition, and that those obtained in 1880 were planted to the number of 184 at a place called Vedarniem, and did so well that in the following year 443 plants were obtained and planted out at Vetangudi. Of these, however, only 297 remained at the close of 1882, and all the remaining male trees were in a dying condition. This unfavourable result was attributed to the very unsuitable nature of the site selected. We are glad to note that the Madras Government have directed that measures should at once be taken to obtain 50 lbs. of seed of the best varieties of Arabian date from Messrs. Gray, Mackenzie and Co. of Bussorah. These are to be sown in suitable localities by the Forest Department. We hope to hear in due time the result of these measures.

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The following is a summary of the German home trade taken from *Kuhlow's*, for the week ending 25th November 1885:—

An event calling for mention in connection with the commercial history of the week is the opening of the Reichstag after its long recess of nearly six months. The inaugural speech referred to the new customs tariff and promised reforms in brandy and sugar taxation, which, indeed, have been desired for some time. Reference was likewise made to the North Baltic Sea canal scheme, to which we alluded in this place last week. Not less is it a matter for satisfaction to the commercial world for personal reasons than to the nation at large from the coast defence stand point, that this project is now in a fair way to accomplishment. Commerce, especially so far as the Western parts of the country are concerned, is sure to receive stimulus when vessels are able to run through the neck of land which divides the mouth of the Elbe from Kiel Bay. Though there is no burning commercial question to engage the attention of the Reichstag this session—such, for instance, as the tariff question—there is a likelihood of trade and industry receiving a full share of discussion. Coming now to our review of the week, we are fortunately able to report a very decided improvement. The *Iron* trade has been cheered by the publication of further rail contracts of considerable amount and by the prospects of others in the immediate future. Business is as bad as before in Silesia, but in Rhenish-Westphalia a most welcome improvement has set in. The *coal* trade is well situated in accordance with the season of year, and in Upper Silesia the railway sale has been so great that there has been quite a dearth of waggons. The *Sugar* market is decidedly stronger. A good effect has been produced in the market by the announcement of a greater falling off in the production of Europe during the recent campagne than was expected. It need hardly be said that the soul of the sugar manufacturer and dealer has been cheered by the better outlook The *Wool* trade has been somewhat better situated, the purchases of manufacturers having been larger and more varied. It is believed that an upward tendency has set in The demand for *Cotton* continues on the whole weak, though at some centres the market has been animated during the week, the present low prices having induced considerable operations. Spinners are not able to report better quotations. The second half of the month has brought life to the *Leather* market, in which there has of late been more business in almost all departments Prices have been maintained in the *Corn* trade, but the trade in wheat, rye, and barley is poor, the disturbances in the East not being without influence. Oats are better. The *Wine* trade has been very dull, but great animation has characterised the spirit market, prices having risen all round There has also been tolerable activity in the *Tobacco* market. On the whole the outlook is much better.

COTTON IN ASSAM.—I.

A short time back we noticed briefly the extent to which cotton was grown in Assam; we now propose to examine minutely the report submitted by Mr. H. Z. Darrah, the officiating Director of Agriculture, Assam, on this subject.

The variety of cotton which is chiefly found in Assam is the variety known botanically as the *Gossypium herbaceum*, which is also extensively cultivated in Southern Europe. As previously stated, the absence of accurate statistics renders it rather difficult to arrive at a correct estimate of the area under cotton. This is the more to be regretted, as in the Assam Valley, where alone the rudiments of a registering system are to be found, the crop is almost unknown; while in the hill districts, where no registering agency of any kind exists, cotton forms a very important article in the annual agricultural outturn; and the absence of any means of accurately guaging its amount is a matter of regret. In Lukhimpore, and Sibsaugor, on the lower slopes of the Bhootan Hills, in Kamrup and Goalpara, cotton is grown to a limited extent; Nowgong is the only district where it is largely grown. This is due to the fact, as Mr. Darrah says, that the range of the Mikir Hills is included within its boundary. These people (Mikirs) grow cotton not only for domestic consumption, but also for export. The following figures are approximate estimates of the area under cotton in the Brahmaputra and Surma Valleys:—

		Acres.
Brahmaputra Valley ...	Goalpara	1,622
	Kamrup	248
	Nowgong	3,286
	Durrung	388
	Sibsaugor	88
	Sylhet	100
Surma Valley	Sylhet	900
	Cachar (Sudder Sub-division) ...	500
	Total ...	7,132

These figures relate to the plains districts; but in the range of mountains extending from the head of the Brahmaputra Valley to the confines of Mymensingh, cotton is nearly everywhere a staple crop, the one exception being the high plateau of the Khasi Hills, where, owing to the severity of the cold, it is altogether, or nearly, excluded. The Garos grow it very largely, and the inhabitants of the Khasi and Jaintia Hills, says Mr. Darrah carry down hundreds of maunds every year to Kamrup and Nowgong. The method of estimating the outturn and the area under cultivation, is somewhat primitive, but the following figures furnish an approximate estimate of the actual area under cotton in the hill districts:—

	Acres.
Garo Hills	22,933
Khasi	1,250
Jaintia	3,500
North Cachar Hills	4,000

No estimate has been given for the Naga Hills, as no attempt, we are told, has so far been made to collect any statistics in this district. Adding the figures for the plains and hills, we have a total approximate area under cotton in the province of 38,815 acres.

On the subject of varieties, Mr. Darrah gives some interesting particulars. There are apparently only two well marked varieties, the one being described as the large-leaved, high growing kind, bearing white flowers. The pods are very large, sometimes as much as 8 inches in length, and when they burst, says Mr. Darrah, "the contents come out in a cataract of cotton, which gives a field the appearance of being covered with snow." But this variety does not seem to be in much request for ordinary purposes as the smaller kind, the fibre being said by the trade to be harsh and to twist badly; but it is said to be well adapted for mixing with wool. The other, the small-bolled species, bearing reddish flowers, and particularly that grown in the Jaintia Hills, is said to be the best cotton grown in the province. Its recommendations being that the thread can be more closely woven than that of other kinds. Mr. Darrah also mentions a *khaki* variety found in Cachar and Munipore, the pods of which are described as not being of a uniform *khaki*, but containing a few white threads here and there.

(*To be continued.*)

BUNDS AND TREES ON PADUGAI LANDS.

[*Communicated.*]

The term *padugai* requires to be explained at the commencement. It is the Tamil name given to that portion of the land lying between the banks and the stream, or in other words the bed of the river from which the water has receded, and over which is deposited, in time of flood, the silt suspended in the water of a river. The area covered by it varies according to locality. In the Tanjore district, it is usually broad and extensive, but in other districts, such as South Arcot, it is narrow and limited. Generally it covers a space of 30 or 40 yards. The soil of such lands is generally more fertile than the adjacent plots, not similarly situated, and is fit more for garden cultivation. These lands can be brought to many uses. The plots near the river in the Tanjore district are thickly overgrown with reeds, and are generally covered over by trees of luxuriant growth. The portions of the padugai, situated near the bank, and not covered with reeds, are cultivated in some places with plantain; and in others they are under gardens. The banks are generally 5 or 6 feet high above the level of the padugai lands, which are as high again above the bed of the river. Thus the bank is 10 or 12 feet above the level of the river.

How such cultivated plots and banks prevent the river from overflowing during the prevalence of floods, deserves to be examined. During the rainy season, when the river is full, if there is no high banks, the course of the current in places where the adjoining plots are low, is diverted, and the water thus finds its way into the interior. But by banks being covered thickly with reeds, this is prevented. What is termed "Vaganai" in Tamil is constructed for this purpose in places where the river threatens to take a different course. In such places it is found, a few years after the construction of such "Vaganai," that the level of the land has been gradually raised by the sand of the river being washed and accumulating upon its surface. The land then escapes all danger from the force of the current. It has been said that the planting of reeds and trees is always a sufficient check to the current, when the river is full during floods, but if the flood is excessive the plantation is no more able to check the current, and thus the water overflows the padugai lands. But the water cannot go farther. This is due to the presence of strong banks which obstruct the rush of the water into the adjacent villages and lands. The banks are usually strengthened by the plantation of reeds and grass. Ordinarily in rainy seasons we have water in the river to the depth of 7 or 8 feet; but when we have more, the bunds are a sufficient check to the water. It is only when the water is more than 12 feet in the river, that it can overflow the banks. This, as far as it has been observed, occurs very rarely. It is only then that the people stand in need of the assistance of the authorities to raise the level of the banks to a sufficient height. The people, therefore, in such places are safe and secure from floods and, consequently, from damages.

We have heard that many villages have been washed away and ous damages were caused to the poor ryots during the floods of late years. These calamities are due to the absence of preventive measures that ought to have been taken by the Government authorities, who do not, however, appear to take any precautions at such times They feel the sense of their duty only when it is too late. They should be asked to plant reeds and trees on the dry beds of rivers, and to raise embankments; for, as shown above, these methods protect the people and their lands from floods The Government ought to plant trees and strengthen the portions adjacent to a river, since they are all classed under Punamboke, and as they belong to Government, private interference is punishable. This work, it may be remarked, will not prove unremunerative to Government, for there is some prospect of a revenue to be derived from it. The reeds and grasses would be readily bought by the poorer classes for thatching purposes, for fodder for their cattle, and various other purposes. It need not be pointed out here that trees will also give a proportionate income. Thus we find that these preventive measures, while affording security and protection to the people from floods, would form also a source of income to Government. It may further be stated that this would save the Government the heavy sums they are obliged to spend in times of floods. If the Government should find it inconvenient to take the measures advocated in this paper, it is suggested that the padugai lands of river side villages might be farmed out for cultivation purposes to the ryots under certain conditions, such as they should grow reeds in their respective plots and raise bunds in the same, while they may be allowed to cultivate the rest of their plots and reap the fruits of their labour without having to pay taxes. There is no doubt that they would be very willing and prepared to undertake the above, for it would enable them to have always a good supply of wood for fuel purposes, and provide for manure for their lands. It may not be out of place here to point out to the ryots as well as to the Government that the following trees, as they grow very quickly, yield capital wood for fuel and can be utilised for agricultural implements:—Casurina Equestifolia, Poinciana Regia, Cassia Florida, Calophyllum Inophyllum, Thespesia Populnea, Inga Dulcis, Portium Canditum, and Odina Wodeer.

SAHARUNPORE BOTANICAL GARDENS.

The annual report on these gardens for the year ending 31st March 1883, is before us. Although the report bears evidence of good work having been done during the year, the financial results show a slight falling off. The total expenditure amounted to Rs. 33,230, or Rs. 160 in excess of that of the previous year; while the income amounted to Rs. 8,488, showing a decrease of Rs. 1,040 over that of the previous year. The falling off in the income is explained as being due to the temporary cessation of sales from the hill gardens, to a reduction in prices, and to an ordinary fluctuation in demand Much seems to have been done to add to the appearance of the gardens, especially in the matter of carriage drives and footpaths. Our recollections of these necessary adjuncts in the Saharunpore gardens are not of the most favorable kind, but when we last visited these gardens, Mr. Duthie had only just assumed charge from Dr. Jamieson, the former superintendent, under whose direction, we fear, the gardens were allowed to run into a wilderness. If we remember rightly, the good doctor, though one of the ablest botanists in India, was very much averse to cutting away trees and jungle; and had no soul for the modern style of laying out gardens; we are therefore glad to see that the system of grass plots and shrubberies has been introduced into these gardens. Though a technically conducted botanical garden, we see no reason for omitting those artistic features which add so much to the beauty of the garden. A considerable falling off is observable in the distribution of plants during the past year; for while in 1883-84 there were 145,939, in 1884-85 there were only 42,216 plants sent out, showing a decrease of 103,723. The distribution of the *Agave americana* and strawberry suckers go to swell up the total for the previous year, as they in themselves number no less than 118,055. There is a sensible increase in the issue of acclimatised seeds, from 6,993 lbs. to 19,660 lbs. It is satisfactory to note that by far the greater bulk of these seeds were supplied to the general public.

The collection and preparation of drugs forms an important item in these gardens. The following are some of the drugs, prepared during the past year :—

	lbs.
Extract hyosciamus	262
Dried leaves of „	289
Extract of taraxacum	31
Root of „	250
Kamalia powder	59
Colocynth fruit	119

Among the more interesting additions to the gardens, we note the species of *cousinia* sent by Dr. Aitchison of the Delimatation Commission. The *Napoleona imperiales* is a new species to India, and is a native of West Africa. It has a remarkably constructed flower, and yields a fruit resembling a pomgranate, from the astringent rind of which a kind of ink is made by the natives. The most valuable recent introduction, however, is the *Ipomœa purga*, which yields the jalap of commerce. Three hundred tubers were, it seems, obtained from the Nilgiris, and planted at the Arnigadh garden at Mussoorie, where it is said to be doing remarkably well. The vegetable sowings were more or less failures, having been damaged by the heavy rain of October.

The experiment with potatoes is interesting. It appears that the varieties that have been acclimatized already, and are known as the ordinary country kinds, have given the best results, both in point of yield and quality, and Mr. Duthie pronounces them superior to the imported varieties. The results of three years' successive trials certainly prove the fact that the country kinds, under proper treatment, yield the best crops ; 135 maunds to the acre is, we think, very satisfactory evidence of this fact. The trial of the Italian field turnip shows that the leaves outweighed the roots by a great deal, and Mr. Duthie remarks that " if it is intended to use the foliage of the plant and not the root, as one would have supposed, the experiment is so far a success." The Indian corn experiments showed that, of the imported kinds " Stowell's evergreen sugar corn" was the best of the American varieties. The Kumrah of New Zealand (*Ipomœa chrysoriza*), a species of sweet potato, is considered to be a valuable addition to our varieties of vegetables.

On the subject of cereals, there are some interesting remarks on wheat and barley. Mr. Duthie states that amongst some contributions for the Kew Economic Museum, he took home two samples of grain, one of a variety of wheat called "Gujaria," and grown at Saharunpore from selected seed (the original having come from the Cawnpore Farm years ago) and the other a remarkable variety of loose grained barley of a dark chocolate color, grown from a small sample exhibited at an agricultural show at Saharunpore by a zemindar of the Mozuffernugger district. These samples were considered by Professor Thisleton Dyer, the Assistant Director, Kew Gardens, to be of sufficient interest for being specially reported upon, and he accordingly sent them to Mr. McDougall, the well-known expert in matters relating to cereals, who reported as follows :—

We had much pleasure in receiving your letter of 11th instant, with samples of wheat and barley. I have shown them to most of the principal people in the corn market, who took much interest in them. The wheat is valued at about 30*s*. per 496 lbs , it being classed with the Kubanca (Russian wheat) its bright and clean appearance causing much remark. On grinding and pasting, I find it contains much gluten, but is somewhat sticky. Is there any particular reason to grow this seed, as I think it would pay better to grow the white seed such as is now shipped from Bombay, and is now worth say 39*s*. per 496 lbs. here. Quantities from this (your) sample would at once command a ready sale, and if you could procure say 20 quarters, I shall be glad to grind and bake it and report to you. *The barley* ; This was looked at with much interest, and many opinions expressed upon its being quite new; the value varied from 23*s*. to 30*s*. per 400 lbs, I notice on damping it that each grain sprouts well and so will malt, but the color comes off and so would not do (it is thought) for pale ales, but it might do well for stout. For feeding purposes it would be useful although it would take time to remove prejudice to its color. Is this seed likely to grow better than the ordinary barley or is it possible to grow a huskless barley of the ordinary color ? I am much obliged to you for sending these samples, which are so very interesting, and shall always be pleased to give you any information in my power.

The following remarks by Mr. Duthie on this subject are worth reproducing :—

The wheat is a very hardy free-growing sort, and always gives a good yield both in grain and chaff. Last season the yield was 18 maunds and 13 seers chaff per acre. This variety possesses the good quality of being able to stand well up when grown in highly manured soil ; for, as is well known, most varieties of Indian wheats run up into straw and fall over before coming to maturity when the soil is too highly manured. This variety is thus well adapted for those who attempt to cultivate wheat according to the European method.

The chocolate colored barley produced 15 maunds grain and 12½ maunds straw per acre. The yield of grain was thus heavier than the yield of straw. The objection as to color alluded to in the report is fatal to its value, and will prevent its ever being grown except as a curiosity. We possess a white-grained variety of huskless barley, and a good large sample of this has lately been sent to Kew for special report. The huskless barleys appear to be quite unknown in England, and as everything except color was favourably commented on in the case of the variety sent, I am in hopes that the report on the white variety will be altogether favourable and perhaps become the means of bringing this barley to the notice of the English markets. The three varieties of oats, *viz.*, " Challenge," " Irish White," and " White Russian" have again done well Only a small proportion of the seed sown germinated ; this is always, however, the case with seeds saved from freshly-imported cereals. The whole of this season's heads are well filled up with grain, and in another year I shall probably be able to give some idea of the yield per acre.

(To be continued.)

AN ENTOMOLOGICAL LECTURE.

On the 18th instant there was a large gathering of ladies and gentlemen at the Dalhousie Institute, having been invited by the Honorary Secretary to see a splendid collection of insects made by Mr. Mowis in Sikkim. The cases containing the collection had been laid out in the Institute, and almost formed an exhibition of themselves, though they are intended for the Indo Colonial Exhibition in London. Every class of insect was represented, and the gorgeous colours of some of the butterflies and beetles baffle description. Shortly after 9 o'clock, the Honorary Secretary introduced Mr. Mowis to the audience, and the lecture which followed was listened to with the utmost attention. Free from all technicalities and abounding in amusing stories out of the history of insect life, Mr. Mowis's comparisons of the different powers and faculties [illegible]ly to be met with in insects, made up a concise and able disquisition that kept his audience thoroughly interested. In addition to [illegible] interest as a lecture, there were facts made known of real importance and great practical value. We quote the part relating to silk and sericulture of India, and only wish we could give it in *extenso*. Describing the three great silk-producing families of moths, the lecturer said that the first family contained all those cultivated and domesticated by men ; secondly, those that are left to themselves to weave their silk in the jungle, and are called wild silk-worms ; and thirdly, those silk-worms which spin a cocoon, but have no commercial value at present. In former years, he said, India had a very large silk industry, but owing to prevailing diseases of the silk worms and years of drought, it is now scarcely one hundredth part of what it once was. Government had made many efforts to revive it, and tried hard and incurred heavy expense to give a new impulse to this industry, but though land and labour are cheaper here than in any other part of the world, the lecturer was doubtful whether the mulberry silk would ever regain its former footing in India. It takes, we learnt, three years to make a plantation fit to feed the worms to make good marketable silk, so that it is impossible to attempt any large scheme ; but as the lecturer remarked, if we are unable to obtain the best silk except at a loss, get the next best that pays—and pays well. Therefore every encouragement should be given to the tusser industry in this country. Mr. Thomas Wardle has just reached this country, having been sent out by the Home Government to investigate our silk industries. He was the British delegate at the late Paris Exhibition, and has demonstrated the fact that tusser silk can now be reeled and spun, bleached and dyed, in splendid colours, and [illegible] used in almost any material where formerly the best silk only were employed. A demand has, therefore, sprung up where there is at present but a limited supply. The tusser cocoons are found in every part of India, and the worms feed on almost every plant. They are very hardy, and little liable to disease, and if Government would only take the matter earnestly in hand, we should have a most extensive industry in the space of a very few years. This new industry would almost equal the waning cotton one, and prove much more remunerative, while giving employment to thousands of the poorer classes to whom this work would be particularly well suited, thus adding largely to our revenues. Lakhs of rupees' worth of these cocoons are shipped home every year, taking up great space on board ship. These cocoons have to be reeled at home on spindles which cost £75 each, and by labourers who demand 20*s.* a week. The same result could be obtained here with labour at 5 rupees per month. The great drawback in all native-reeled silk has always been the unevenness and lumpiness of the thread, but with very little trouble, an improved reel could be introduced here, which would give all the desired evenness. The lecturer exhibited a model reel, which has been constructed by him, and which combined to a certain extent both the European and native methods, and still remained simple enough to suit unskilled labour. The cost of this reel is so low as to be within the reach of the poorest coolie of the country, and by a general adoption of such a reel or a similar one, Indian-reeled tussor silks could be laid down in the European markets at about 10*s.* per pound, and thus give 100°/₀ profit on the outlay! In explaining this reel, it was shown that it reeled evenly, and distributed the silk regularly on the reel, from which it can be removed by a very simple contrivance, without disturbing the layers of the silk, which is very essential. It could be worked by hand or foot, and also be adapted to machinery, and any child could learn to work it in a short time. A case of sample silk was exhibited, which had been reeled on this model, and a small quantity was also reeled before the audience in the lecture hall.

At the conclusion of the lecture, Mr. Simmons rose to propose a hearty vote of thanks to Mr. Mowis, for the very instructive and able lecture they had all listened to, and for having so kindly lent his collection on view, remarking at the same time that lectures of this class were much more likely to be appreciated, than many others which are either too technical or too classical for the general public. Bombay had, he said, a Natural History Society which was doing much good. Calcutta has several scientific societies, but as they are mostly confined to old monuments and coins, it interested only a limited number, whereas a Natural History Society would be liked by many, for even children could be taught many good examples from the very book of nature. The lecture they had just listened to was one particularly suited to stimulate them, and the chairman thought a combined effort should be made to form a Society of Natural History here in Calcutta. The company then separated.

Miscellaneous Items.

Mr. W. D. Gunn, Veterinary Surgeon, Central Provinces, has been rewarded by Government with Rs. 5,400 for his report on Cattle Disease.

Rao Bahadoor Lalshankar Umishankar, Sub-Judge of Ahmedabad, has been granted Rs. 3,000 for compiling certain arithmetical works for the use of students.

There has been heavy rain in Lahore during the last few days. Rain was much wanted, not only in Lahore, but in almost every part of the Punjab.

The rice crop in Tirhoot, and indeed all along the Nepal frontier, has been unusually good and abundant this year. A brisk export trade is already beginning, and prices are low.

A telegram from Madras to the *Times of India* says that increasing attention is being given there to the Mysore gold mines. Eleven hundred ounces of gold from the Mysore Company's mines were shipped home by the last steamer. A great advance in the value of the shares of this company is advised from London. Other mines are looking up.

The quantity of tea exported from China and Japan to Great Britain, from the commencement of the season to the 24th of November last, was 131,688,088lbs., as compared with 129,984,683lbs., during the corresponding period of last year. The exports to the United States and Canada during the same period have been 63,171,205lbs, as compared with 59,760,491lbs.

Some correspondence has recently taken place between the Government of the North-West Provinces and the Supreme Government on the subject of the alleged decrease of the area held under occupancy right in the former province. A careful enquiry was set on foot by the Board of Revenue, selected villages being subjected to a minute scrutiny, and the whole question being thoroughly sifted in the light of the now fairly trustworthy statistics obtained from the putwari's records. The result goes to show that the alleged decrease exists rather in name than in fact. Whilst the area recorded as held by tenants with rights of occupancy at the late revision of settlement, has undoubtedly decreased, the loss has been more than compensated by a steady growth and extension of occupancy rights on other lands. We find in fact that, whereas out of the area of 7,713,866 acres held by occupancy tenants at settlement, 1,070,778 acres or 13·9 per cent has been lost; in 1,614,109 acres or 20·9 per cent of the area at settlement, occupancy rights have since accrued.

During the last few days the citizens of Bombay have had a chance of forming an idea of what the Bombay Court will be like at the Colonial and Indian Exhibition. A large portion of the elaborately carved screen, which will go round the Court, was exhibited by Mr. Wimbridge. Mr. Van Ruith gave a private view of his pictures. Mr. Griffiths showed at the School of Art as many of the fabrics as could be conveniently unpacked. Mr. Terry opened the doors of the Wonderland Pottery Works, and the models of Indian craft were exhibited at the Dockyard. Every one was pleased with the general result. Bombay, there is no doubt, will be very worthily represented. We understand, however, that the Bombay exhibits will not be accompanied by a custodian. But surely this is a fatal blunder likely in itself to defeat the primary object that prompted the collection of so excellent and so representative a series of articles Exhibits have been sent mainly in the idea that the adequate representation of Bombay artwork in London would develop the trade of this presidency, and lead to larger dealings with England. Mr. Griffiths, the secretary of the local committee, is the gentleman we should like to see sent home in charge of the Bombay exhibits. But if this be impossible, a very good substitute could be found in Mr. B. A. Gupte, his head clerk. Mr. Gupte has an intimate and technical knowledge of all the Bombay art industries. He is a well known authority on the subject. In five minutes conversation he could probably tell any English dealer more about any fabric or any ware than could be gathered from hours of study. What is more, he is intimately acquainted with the producers on this side, and could put the English consumers into direct connection with them. He would also have the opportunity of learning while in England what qualities of goods are best suited to the English market. After all the money that has been spent in the Bombay collection it would be a pity to risk the loss of the ship for the want of a halfpenny worth of tar. Mr. Gupte's expenses could not be heavy while the possibilities of a good return would be very promising.

Selections.

ENSILAGE AT ALLAHABAD.

As the experiments in ensilage conducted during 1884 85 at Allahabad in connection with the preservation of grass, were perhaps larger and more comprehensive than any experiments which ever took place at any other one place, I propose submitting a report, showing generally the process of this method of the underground preservation of grass, and in detail the contents and outturn of the several silos dug in Allahabad cantonments.

Eighty-four silos in all were dug, and filled with grass, &c., between 23rd July and 29th October, 1884. The dimensions of the majority of these were 30' + 12' + 6', while the rest were of various sizes.

The silos were so situated, as to be in the centre of the plot, from which it was intended the grass should be cut. This was done to avoid the necessity of engaging carriage to take the grass to the pits, and by these means the only expense incurred in filling the silos was the contract rate of cutting the grass, *viz.*, about 9 pie per maund.

It was found by experiment that a field or plot of about five acres of ordinary grass land, will fill a silo 30' × 12' × 6' dug in the centre of it. The coolies who cut the grass will carry it and throw it into the pit.

The cost of three silos of the above size was Rs. 11, or at the rate of Rs. 1-11-2 per 1,000 cubic feet. In addition to Rs. 3-10-8 for excavating the silo, there is the charge for covering and uncovering it with 4½ feet of earth which is about Rs. 1-5-4, and hence the total expense connected with a silo 30′ × 12′ × 6′, containing 600 maunds of grass, should be about Rs. 5.

The principle on which these experiments were carried out, was to find out the very cheapest method of preserving grass, karbi, mothi, &c., so as to bring it within the power of the poorest villager to store food for his cattle. It was with this object that only earth silos were dug, no elaborate means of draining or pressing were attempted, the experiments were conducted in the simplest and cheapest form, and though a small percentage of the silos was not good, yet on the whole the experiment may be deemed to have been highly successful, and considering that the operations were nothing more than digging a hole in the ground and filling it with grass, it is highly satisfactory that over 40,000 maunds of food so stored should have been eaten, and eaten with relish by the cattle (numbering 1,000) and upwards of 1,200 ponies.

To examine the financial results of the above operations it will be seen that, roughly speaking, the silos containing these 40,000 maunds of fodder cost Rs. 350, and the cost of cutting the grass was Rs. 1,875, and thus giving even the liberal allowance of 40 lbs. per head per bullock per day, it would be possible to feed 80,000 cattle for Rs. 2,225, or in other words, to forage over 200 bullocks daily for a whole year at a total cost of Rs. 2,225, or at the rate of Rs. 11 per bullock per annum.

Now at the most moderate computation and giving only 20 lbs. per diem, it would cost to feed a bullock on bhusa Rs. 45 per annum, or more than four times as much as the ensilage. This is taking the rate of bhusa at 8 annas per maund.

The only precautions necessary in filling an earth silo, are to heap the grass as high above the surface of the silo, as the depth of the silo, and then to cover the grass so heaped up with the whole of the earth which has been previously excavated, care being taken to cover a margin of 2 feet all around the sides of the pit to keep out air and water. With a few exceptions nearly all the Allahabad silos were filled while it was raining hard.

When a silo has been covered up, great care must be taken in filling up any cracks or crevices the moment they happen to appear.

For the first twenty-five silos that were made, an elephant was employed to press the grass, but subsequently the services of the elephant were dispensed with, and no pressure other than the weight of the excavated earth was used. The latter appears to be quite sufficient, and is the least expensive form of pressure that can be applied. It is of course highly important that the weight of the earth so put on should be equally distributed.

Another form of pressure that was tried was wooden sleepers; but unless great care is taken in placing the grass evenly, it is very difficult to obtain an equal pressure, as the sleepers being flat will naturally press only on the highest points of the grass. Our experience seems to show, that the earth pressure is all that is necessary, if carefully applied.

A most important result was obtained from 12 silos, which were made along the line of rail between Allahabad and Manauri, for though they were filled almost entirely with the coarsest description of grass, *viz.*, kusa, kasa, and ganhra grasses, which make poor hay, yet the ensilage turned out excellent.

The coarse grasses came out of the silo soft and succulent, and that they were nutritious and palatable was proved by the condition of the bullocks during the issue of this ensilage, and by the greedy manner in which the animals devoured this fodder.

I think also that results proved that for the purpose of being siloed, grass should be cut either with the "jabao" (small circular scythe) or with the "hassa" (sickle), and not with the "kurpa," for with the latter it is almost impossible to avoid scraping up dirt and roots, which not only make the ensilage gritty and unpalatable, but also tend to cause it to have an obnoxious smell.

After opening the silos on the railway, we opened eleven that had been dug on the Fort Esplanade. These were formed from the following good grasses, *viz.*, bandari, janewah, mussel and dhub, and turned out excellent. These grasses had been in the pits about six months, and came out as green as when put in.

I then had to open out the silos in new cantonments. These did not turn out so well as those on the railway and fort, and three or four were so bad that they had to be closed again. The smell of this ensilage while in the pit was malty, but when removed and exposed to the air, it became unpleasant, resembling a tan-yard in smell. Most of it, however, was greedily devoured by the cattle, though some three or four silos could not be used.

The reason the silos in new cantonments were not so good as the others can fairly be attributed to the fact that the grass put into them was immature and young, and from this the following deduction can be made:—Ensilage to be good should be made from grass cut just before it flowers, and this will allow a good second crop to spring up for hay.

The Transport Lines in Allahabad are in every way inconveniently situated, being in what are called the Chatham Lines, three or four miles away from the barracks, commissariat godowns, and other places in which the bullocks are called upon to work. This necessitates most of the bullocks for duty having to walk four miles before their work is begun, and again to perform a return journey of four miles when their work is finished. Carrying the ensilage to the Chatham Lines was fraught with a great deal of inconvenience, for to get there from new cantonments necessitates passing through the greater part of the civil station, the inhabitants of which naturally complained of the smell of the ensilage. As soon as it was found that annoyance was being caused, the issue of ensilage to the animals in the Chatham Lines was stopped.

Ensilage has a curious smell, very like that of a tan-yard, which is unpleasant to any one unaccustomed to it, but which ceases to be unpleasant after one is used to it. There is nothing to show that the smell is at all unhealthy, on the contrary the coolies who were employed daily on the silos, kept in excellent health, and the siege train bullocks who were fed almost entirely on it, kept well and in very good condition. There was only one death amongst these animals, and that was caused by rinderpest. This epizootic disease spread considerably amongst the new bullocks bought for the proposed expedition for Quetta, and caused many deaths. The commissariat slaughter cattle were fed almost entirely on ensilage, and nothing else, with the most favourable results. I mention this as an idea seemed to have gained ground, that the deaths amongst the new purchases were due in some way to the ensilage. This can hardly be maintained in the face of the following facts:—

(a). Siege train bullocks fed on ensilage from the time of the first silo being opened, to the last being closed, kept well and in good condition.

(b). Slaughter cattle same result.

(c). Slaughter sheep fed partially on ensilage with good results.

(d). Ponies fed on ensilage.

I think it has since been incontestably proved, that the deaths among the new bullocks were due to rinderpest, and that the disease was raging in the villages round about Allahabad is well known, and was witnessed by the Major-General and Deputy Assistant Quartermaster-General of the Division, who, when out in the district, saw the corpses of many hundreds of bullocks that had been carried off by this disease.

I made an experimental silo with wonderfully good results. It was filled in the following manner:—At the bottom was placed about 2 feet of green "mothi," next some rather dry munj; on this came some 2 feet of chaffed sorghum, then a layer of dry karbi, pressed pown by about 6 inches of green mothi, and on the top of all a layer of sorghum. This pit was opened on 13th May, 1885, after having been covered for 6½ months. Two inches sorghum at the top had to be discarded. The remaining articles came out most excellent, the dry Karbi appearing as juicy and fresh as the green. The animals devoured this ensilage in the greediest manner.

I attach a statement* showing the result of each silo in detail and in conclusion I submit the following summary of what would appear to be the facts ascertained in connection with this most interesting experiment, which was conducted on so large a scale at Allahabad this year:—

(1). It does not appear necessary to go to the expense of building masonry silos, or to take any particular precautions in draining and pressing, as an earth silo seems to fulfil all the necessary conditions, and apparently drains itself if kept air and water tight.

(2). The only pressure that seems to be necessary, is that caused by the excavated earth being piled on the grass.

(3). The best time to cut the grass is when it is mature, between 15th August and 1st November; this will give a second crop for hay.

(4). The fact of its raining while a silo is being filled, does not appear to do any harm.

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* We are obliged to omit this for want of space.—Ed., *I. A.*

(5). The ensilage should be issued green, *i.e.*, as it is taken out of the pit.

(6). Thirty-five lbs of ensilage would appear to be equal to 20 lbs. of bhusa, the ration of a siege train bullock.

(7). Ensilaged karbi forms good food for elephants.

(8). The fact of cutting the grass for ensilage, gives a finer and better second crop for hay-making.

(9). Silos should, in my opinion, be made wedge shaped, *i. e.*, rather wider at the top than the bottom, and with sloping sides, to preserve an even pressure. The floor and sides might be baked by burning rubbish in the pit.

I trust that the experimets at Allahabad may in the course of time show the villagers and country people, that they have now a sure and safe means at hand for preserving fodder for their cattle, and a cheaper method by far of procuring good fodder than any now in existence; and in conclusion I would point out that the success of these experiments is mainly due to the intelligence and hard work of Sergeant Meagher, of the Commissariat Department, who has not only been out in all weathers, but has taken an intelligent interest in the operations, which has gone far to make them so successful.

S. C. F. PEILE, Captain,
Assistant Commissary General.

EXPERIMENTAL BOTANICAL GARDENS.

From M. A. LAWSON, Esq., Director of Government Gardens and Parks, &c., Nilgiris—To the SECRETARY to Government, Revenue Department,—(No. 313, dated Ootacamund, 13th November 1885):—

I have the honor to acknowledge the receipt of Proceedings of the Board of Revenue, dated 1st October 1885, No. 2783, together with G. O. S., dated 26th October 1885, No. 1188, calling for any remarks which I may have to make upon their proposal to establish experimental botanical gardens recommended by them at Gudalur, Kuttalam, Russellkonda, Hosur, Ramandrug, Yercaud, Chittoor and Palmaner.

2. I will at the outset observe that the object of establishing experimental gardnes is to discover in what particular districts plants of commercial and other value may best be cultivated, and therefore that the localities selected should differ from one another, as much as possible, in temperature, rainfall and character of soil, that it would be a waste of money and energy to establish more than one garden where the above conditions are similar.

3. Mr. Galton, acting Collector of Bellary, writes that there is "A garden situated in a basin just below the plateau of Ramandrug, which was formerly a soldier's garden, and is the property of Government." This, so far as I can tell without actual examination of the site, would seem to be a most eligible place for a garden. It is in the plains, and the proposed site is already the property of Government.

4. The remarks made by Mr. Burrows, Collector of the Nilgiris, respecting Gudalur, I can corroborate from personal knowledge. It is about 2, 500 feet above the sea, has a heavy rainfall, and would represent very fairly what might be grown upon the Wynaad plateau generally. Mr. McWatters, Collector and District Magistrate of Salem, strongly recommends a garden in the neighbourhood of Yercaud on the Shevaroy Hills, and he encloses a most practical and interesting letter on the subject from Dr. Shortt. I do not think, however, that the differences between the climate and the soil of the Shevaroy Hills and those of the Nilgiris Hills are sufficient to warrant my proposing to Government that a garden should be established here. I say this with a special regret, for no one who knows Dr. Shortt's botanical work would be willing to lose the experience and advice which it is certain he would have been ready to give in all cases of doubt and difficulty.

5. Mr. Lee-Warner, Collector of Tinnevelly, makes several very valuable suggestions. He points out how Government have been great pecuniary losers in past days by establishing spice gardens where their management had been neglected, and he most truly states that we should take the lesson which history teaches, and not attempt to establish any new garden unless a permanent expert cultivator can be guaranteed. I entirely agree with Mr Lee-Warner, and it would be the business of the Central Botanical Department to train gardeners, who should be fitted to hold the head overseerships of all gardens which Government may decide upon establishing.

6. Mr. Lee Warner further gives it as his opinion that there are many planters who would be quite ready to assist any experiment which Government might wish to make. My obligations to gentlemen of this description are too many to allow me to doubt for a moment Mr. Lee-Warner's statement; but the planter has generally too much upon his hands to pay that close attention to the cultivation of new plants which is so necessary, when the conditions of their growth, in a new country, are imperfectly understood. Mr. Lee-Warrer speaks highly of the country about the falls of Kuttalam, and as this is a place of great botanical renown, I do not think that Government could do wrong in establishing a garden here.

7. In addition to the above, I think that a garden in the neighbourhood of Russellkonda in Ganjam would prove of use, as it is in the extreme north of the presidency and on the east coast. I do not however know anything of that part of the country.

8. I would suggest then that, in addition to the gardens at Ootacamund, Coonoor, Barliyar, and the one sanctioned at Calicut, there should be established four new ones, Ramandrug, Gudalur, Kuttalam and Russellkonda. If these new gardens are sanctioned by Government, the cost of making them and the cost of their upkeep would be as much as Government would find advisable, while their proper inspection would occupy as much time as the head of the Botanical Department could conveniently afford.

AGRICULTURAL EDUCATION.

PROFESSOR WALLACE, in his inaugural address in the Edinburgh University the other day, dealt with some important points connected with the above subject. His remarks on the importance of landed proprietors and their agents being thoroughly instructed in the principles and practice of farming were as well timed as they are sound. Proprietors, it is felt on all hands, have hitherto left far too much to their factors in the management of their estates. Even where the latter are thoroughly qualified for the work, the relationship of landlord and tenant would be on a far more cordial and satisfactory footing were the former to look more closely into their own affairs. When the parties are brought together more or less frequently in the transaction of business that concerns them both, they are led to understand each other better, there is less friction, and, in fact, a more cordial relationship springs up between them. To enable them to fulfil their part with intelligence, judgment, and justice to their own interests, it is indispensable that they should be well acquainted, both theoretically and practically, with farming matters. Agents, however, must be employed to some extent to transact necessary business in the absence of their principals, and to carry out what has been determined on. There is the same reason, therefore, why they should have undergone a thorough training not only in the details of estate management, but also in practical agriculture. It has often been said, with too much truth, that lawyer-factors have been the curse of Scotland. Too often they have done not a little to embitter the relationship between landlord and tenant. They seldom know much about land, and some of them have the additional weakness of not being conscious of their own ignorance in the matter. The sooner they are superseded entirely by intelligent practical men who know their business, the better for all parties concerned. An able factor, who has had the great advantage of both a scientific and practical training, can often do much by counsel and encouragement to develope the natural resources of an estate, and thereby confer a substantial benefit upon both the parties between whom he is called upon to act.

The severe depression has done more than anything else to dispel the very prevalent idea that any person on a day's notice was qualified to be a farmer. The popular idea might be expressed by a parody of a well-known couplet of Byron in his *English Bards and Scotch Reviewers*—

> 'Man serves a time to every trade save
> Farming; farmers all are ready made.'

Professor Wallace thinks that the best scheme by which to give the rising generation a thorough acquaintance with both the scientific and the practical sides of farming is to get them to study in the class-room during the winter months, and undergo a course of practical instruction on the farm during the summer. It would, no doubt, be better to have an agricultural college with a full staff of professors, and a mixed farm attached to it, where the practical could be taught alongside of the scientific and theoretical. That, however, is not very easily obtained. If agricultural students take part in the work of the farm for, say, three or four hours daily, except for brief periods at the busiest seasons, when the working time might be extended, they will have ample opportunity of becoming acquainted with practical work, and at the same time they will have sufficient time and buoyancy left to pursue their studies in the class-rooms. In fact, they will do this all the better because of their invigorating exercise out of doors. Residence on a farm for a season or more might follow, although it cannot be denied that in many cases the benefit which 'mud pupils,' as they are popularly called, derive from such residence on a farm is not commensurate with the time and money expended thereon. Many may not sympathise with Professor Wallace's objections to that feature of the elementary school system in Scotland and England which prevents children of tender years being kept away from school to assist on the work of the farm. The system of cramming, too commonly practised in Board schools, is highly objectionable, but irregularity of attendance is incompatible with steady and satisfactory progress. Besides, after all, what can a young child—say, under 12 years of age—do to assist in overtaking the work of the farm? It would do children destined subsequently for farm work far more good if teachers were encouraged to impart to their senior pupils in rural districts a knowledge of the elements of agricultural science, in such a way as to help them to understand the reasons, for much of the work they will afterwards be called upon to perform. Elementary technical instruction might be given in the public schools to the sons of farmers and agricultural labourers The latter would thereby be made better workmen, and being of more value to their employers, they would be deserving of increased remuneration.—*North British Agriculturist.*

AGRICULTURAL EXPERIMENTS IN ENGLAND.

THE following is the report of Dr. A. J. Voelcker on the experiments at Woburn, Bedfordshire, submitted to and approved by the last meeting of the Council of the Royal Agricultural Society of England:—

WOBURN EXPERIMENTS, 1885.

A.—STACKYARD FIELD.

1.—Continuous Growth of Wheat.

The wheat was cut and harvested on 20th and 21st August all being got in exceedingly well. Thrashing and weighing commenced on 20th October.

Speaking generally, the produce was lower than in 1884, and more like that of 1883.

The unmanured plots, the ninth successive crop, gave 21·3 and 21·9 bushels per acre, as against 23·1 and 26·6 bushels last year. Mineral manures alone only increased the produce to 22 4 bushels. 200lb. ammonia salts per acre, on the other hand, gave a yield of 31·2 bushels, and 275 lb. nitrate of soda of 28·1 bushels, the increase in either case being comparatively less than last year, ammonia salts, as then, giving the higher yield. Minerals, with 200 lb. ammonia salts per acre, produced 37·5 bushels; and minerals with 275 lb. nitrate of soda per acre 38·9 bushels, the nitrate having a slight advantage. With double the quantities of ammonia salts and nitrate of soda in conjunction with minerals 41·1 and 40 bushels were obtained respectively, the yields in 1884, when no nitrogenous manures were applied, being 32 5 and 21·9 bushels. On the other hand the plots which last year gave 48 8 and 51 bushels when manured with minerals and 400 lbs. ammonia salts per acre in the first case, and minerals and 550 lbs nitrate of soda in the second, now, on the omission of the nitrogenous manures for this single year, yielded only 24·7 and 18 bushels.

It will be noticed that the difference of produce of corn as between ammonia salts and nitrate of soda has this year been practically nothing; but there has been a considerably larger yield of straw with the nitrate, 200 lb. ammonia salts per acre giving 31·2 bushels of corn and 25 cwt. 2 qrs. 10 lb of straw, while 275 lb nitrate of soda per acre gave 28·1 bushels of corn only, but as much as 28 cwt. 0 qrs. 21 lb. of straw. The double quantities, in conjunction with minerals, gave, in the case of ammonia salts, 41·1 bushels of corn, with 45 cwt. 2 qrs. 14 lb. straw; in the case of nitrate of soda, 40 bushels of corn and 53 cwt. 0 qrs. 20 lb. straw. The weight per bushel of the corn was much the same in either case. Where farmyard manure was applied at the rate of 4 tons per acre for the ninth successive year the yield was 22·1 bushels, or 1 bushel only above the unmanured plots; applied at the rate of 8 tons per acre it gave 31 8 bushels, against 38 bushels in 1884. Where farmyard manure had been given each year up to 1882, and omitted since then, only 19·3 and 20·1 bushels were produced or rather less than on the unmanured plots.

2.—Continuous Growth of Barley.

The barley was cut 25th August, and carted the next day. It was thrashed and weighed 20th October and following days, all being in good condition. With one exception the yield was lighter than in 1883. The unmanured plots gave for the ninth successive crop 21·8 bushels and 22 5 bushels, as against 32·3 and 33·3 bushels in 1884. Mineral manures gave no increase, 21 bushels being the produce. 200 lb. ammonia salts per acre increased it to 34·[illegible] bushels, and 275 lb. nitrate of soda to 37·2 bushels; minerals added gave a further increase in each case to 48 and 50·3, while the same minerals with a double quantity (400 lb.) of ammonia salt gave 58 7 bushels, and with a double quantity (500 lb.) of nitrate of soda 64·5 bushels, the latter being the highest produce of any of the plots. It will be observed that in the case of barley, nitrate of soda did better than ammonia salts. When nitrogenous manures, through applied with minerals in 1884, were now omitted, the yields were 39·3 and 34·8 bushels only. With farmyard manure the crops were lighter than in 1884.

3—*Rotation Wheat.*

The respective yields were:—

	Bushels.
Decorticated cotton-cake dung	... 49·4
Maize-meal dung	... 53·1
Equivalent in artificials to decorticated cotton cake dung	... 44·8
,, ,, ,, maize-meal dung	... 47·5

4—*Rotation Barley.*

The yield of the four plots were:—

Decorticated cotton-cake dung	... 62 4
Maize-meal dung	... 58·6
Equivalent in artificials to decorticated cotton-cake dung	... 63·7
,, ,, ,, maize meal dung	... 59·9

5.—*Rotation Tares.*

Tares were grown in plots, 1, 2, 3, 4 of rotation 1 without manure, but the prolonged drought almost entirely spoiled them, and they were thoroughly blighted. They were, however, cut early in August, but while on the ground, a gale springing up, blew the produce of the separate plots to all parts of the field, so that it was impossible to separate them. They were not worth thrashing.

6.—*Rotation Peas.*

These also suffered sadly from the drought and blight. They were cut early in August, and thrashed October 20, the yield being a miserable one. No manure had been applied to any of these plots this year.

	Bushels.
Decorticated cotton-cake plot	... 15[illegible]
Maize meal plot	... 12[illegible]
Equivalent in artificials to decorticated cotton-cake	... 11·[illegible]
,, ,, ,, maize meal	... 13·1

7.—*Rotation Swedes*

These, considering the want of rain, have done very fairly well, and will be ready the middle of November.

8.—*Rotation Mangolds.*

A fair even crop, and are now being pulled.

B.—LANSOME FIELD.

The barley was cut and stacked August 26-28, and will be thrashed shortly. There is a good crop of clover on all the plots.

C.—WARREN FIELD.

This barley has also been cut and stacked, and will be thrashed soon. The clover, though not as good as in Lansome Field, is a very fair plant.

D.—CLOVER AND GRASS EXPERIMENTS

It is proposed to plough up and re-sow with pure seeds all the grass plots in Stackyard and Warren fields. Also, the red clovers and alsike having entirely died out on almost all the plots, these plots will be dug up and re-sown. The white clover plots, which still are fairly luxuriant, will be left as they are. Three acres of land have been selected in another field—*Great Hill Bottom*—and will be sown in spring with grass seed mixtures of varying cost; the separate grasses will also be sown on small plots in the field.

E.—ENSILAGE EXPERIMENTS

Siles 1 and 4 have been re-filled—No. 1 with 3 tons 12 cwt. of meadow grass to be converted into 'sweet' silage; No 4, with 15 tons 3 cwt. of meadow grass, to be made into 'sour' silage. There is also available for feeding experiments Sile 3, containing silage made from 18 tons 3 cwt of green oats (chaffed). Tubs to correspond to the above have also been filled.—*N. B. Agriculturist.*

THE ORCHARD OF AMERICA.

One of the surprises prepared for the visitors to the St. Louis fair was a display of the choicest fruits ever grouped in a single exhibit to feasten the eye and tempt the appetite. It outranked and outrivalled all competitors, and was crowned with a wealth of blue ribbon awards, most honestly bestowed. This fruit, which we mentioned in our last issue, was grown in a comparatively new fruit region—north-western Arkansas—but which has fairly earned its new title of "The Orchard of America." Through the courtesy of Mr. D. Wischart, general passenger agent of the St. Louis and San Francisco railway, a representative of the *Farmers' Review* enjoyed a most delightful trip through this garden of Eden. The St. Louis and San Francisco railroad passes through some of the richest and finest farming lands of south western Missouri, and then across the great fruit-bearing belt of north-western Arkansas. If there are any particular sections which are favored more than others, we could not hesitate in selecting the counties of Washington and Benton as the cream of all the land traversed by the St. Louis and San Francisco railway. At the Fort Smith fair the display of fruit and other farm products from the above-named counties was exceedingly grand, and, as was to be expected, the exhibitors from that favored section of the State carried off the honors over the heads of most worthy competitors from other parts of the country. Crawford, Washington and Benton counties lie adjecent to the famous Cherokee lands in the Indian Territory, each being cut in half by the St. Louis and San Francisco railway, which has its mid-continent depot at Fort Smith on the Arkansas river. The soil is as rich as the Oklohoma lands, the climate all that could be desired—never too hot and never so cold as to injure any kind of fruit trees. The people are sociable, cultivated and full of enterprize, rich in their possessions and content with the beauty of their surroundings. The Chicagoan, who visits north-western Arkansas for the first time, is disappointed in not meeting with cow-boys and other unsavory denominations which figure chiefly in yellow-back literature and sensational sporting sheets. On the contrary he finds an industrious and intelligent people, happy in their increasing wealth; school houses and churches are nearly as numerous as in the longer settled states of Indian, Ohio and Illinois. Aside from the fertility of the soil, climate and other natural advantages, this country owes its rapid advancement and development to the St. Louis and San Francisco railway which provides rapid transportation of the crops to the markets of St. Louis and [illegible]. Persons seeking new homes in the West should visit the north-western portion of Arkansas before making a selection of land, and when they do they will thank the *Farmers' Review* for calling their attention to this—a new Eldorado.—*Farmers' Review.*

BURMESE PETROLEUM.

[Communicated.]

Considering the intense and universal interest now centred on Burmah, with the probability of annexation, and almost certainty of British supervision; it is to be hoped that her resources of wealth in petroleum will no longer be neglected as hitherto. It is beyond question a grave scandal, that throughout the Indian empire, we should be using kerosine from America, for no better reason than a sort of oriental apathy that prevents us, up to date, from using some of the enormous supplies so close at hand. We shall do well to ponder over the very opposite qualifications; that is to say, the indomitable energy and perseverance of Messrs. Nobel at Baku on the Caspian Sea. Messrs Nobel have received no assistance from any [illegible] They wanted means of carriage—receiving no help, they constructed [illegible] own fleet of steamers, and constructed them to use their own petro[illegible] waste as fuel; they then wanted larger ones to take the petroleum to a railway station on the Volga; they constructed the larger. They asked the railway for oil trucks; the railway authorities made [illegible] so Messrs Nobel made their own trucks; though of cou[illegible] railways profited equally by the traffic. Then as ice blocked the river for long periods, they wanted a large number of spacious depôts. Again Messrs Nobel were not to be beaten, and made the depôts for themselves, feeing the railway authorities to conduct the sales, and great has been the reward for all this energy. Locomotives using this fuel are running day by day nearer to our northern boundaries, and the latest news is, that Messrs. Nobel's kerosine is entering the Bombay and Kurrachee markets, to compete with the American article, as it has already so successfully done in Russia—and we, what have we done? We have found the oil near Mettah, and we have known of it for many years near Rangoon; but there the story ends. In these days of experiments all forms of work, as heat units, it is not difficult to perceive what enormous resources the presence of petroleum lays bare. Not only shall we have exceedingly cheap fuel all over India, we shall also, in many cases, solve the difficult question of preserving our hills from being denuded of fuel and interfering with our rainfall, but we shall also gradually introduce the singular and cheap forms of engines used for so many purposes near Baku. We shall have a fleet of oil-burning steamers on the Irrawady first, and later on to England itself. Practical men will soon realise the convenience of a run to England and back, without losing time to coal even once on the journey. All who have tried it say there is nothing so satisfactory as the automaton stoker who never neglects his work, *i.e.*, the self-feeding engine. But these results, and many more, of which we have no space to speak at present, are not to be obtained by sitting still with folded hands. Unless we wish such a man as Robert Nobel to step in and take the trade from us, we must bestir ourselves, learn a lesson from Messrs Nobel or brother Jonathan, and lose no time in starting business. We have no hesitation in saying that this is the most important thing to be done in Burmah. All other trades will follow in its wake, for it will afford means of communication by land and sea. —*Madras Mail.*

HYDROCHROLATE OF COCAINE.

Dr. Freud, of Vienna, published in August a research on the alkaloid, which stated that it caused local anæsthesia of the tongue, Dr. Koller argued that if it deadened the sensibility of the nerves of the tongue, it would have a similar effect on the nerves of the eye. After many experiments on animals, on himself and friends, and afterwards on patients, he published his discovery at the Heidelberg Ophthalmological Congress in September.

We will give a short account of the results that seem to have been obtained in various departments:—

The Eye.—One or two drops of a 4 per cent solution instilled into the eye cause at first a stinging sensation lasting a few seconds. On repeating the application there is a sensation of cold, then comes a feeling of weight or tension and dryness. The eye protrudes somewhat. If the instillation is repeated the pupil dilates. Five minutes after the first instillation the cornea can be handled quite roughly, cut, canterised with silver nitrate, pitted by pressure, without causing the slightest pain or even sensation. There is simply no feeling. When deep incisions are made as for irridectomy pain has been observed by some, though not by others. It is as yet doubtful how deeply the anæsthetic effect can be made to extend; it passes off at the surface in about twenty minutes, and as it apparently takes time to reach the lower structures shown by the dilation of the pupil, it would seem that the application must be repeated to obtain the best effect. The eye remains dilated for some time, but vision is not interfered with, and the eye gradually returns to its normal state. We find reports of three cases where inflammation has occurred after the use of the drug among a very large number, in which it was not observed. One patient who had undergone two irridectomies under others had the globe of the eye excised by Mr Carmalt Jones under the influence of a 2 per cent solution of cocaine. His remark was that it was a great deal better than that beastly ether.

Eyelid.—Mr. Bader has crushed a tumour on the eyelid without causing pain to the patient.

The Tongue.—Mr. T. Smith applied a 20 per cent solution to the tongue of a patient three times within ten minutes. He then applied fuming nitric acid freely two or three times so as to produce a definite burn. No pain was felt during the operation.

The Nose.—H. J. Butlin records his own experience. He has twice had the turbinated bones of his nose burned by Dr. Semon at intervals of three weeks. The first operation caused intense pain and prostration. At the second, the surface of the bones was painted thoroughly twice over with an interval of five minutes, with a twenty per cent solution of the hydrochlorate. The effect was marvellous, far more so than I or even he, I think, expected. The burning was not felt by me more than the introduction of the brush in painting. I cannot say I did not feel the operation, but the sensation must be described as feeling no pain.

The Larynx.—Dr. Semon has also removed growths from the larynx of a lady in whom, at the seven previous operations, the mere introduction of the instrument had caused alarming shocks. After painting the interior of larynx with the 20 per cent solution once, and waiting five minutes, he was able to introduce the instrument four times, and remove considerable portions of the growth, without the patient experiencing any pain at the moment, or subsequent shock hypodermically.

Messrs. J. H. E. Brook and C. J. Arkle, of University College Hospital, have tried the effect of hypodermic injections. The effects, which were common to all the injections were smarting followed by numbness, redness round the point of injection; in fact, in two to three minutes, sensation to touch was diminished, to pain and temperature completely abolished. In every experiment except the last when half-grain was injected into the forearm, the anæsthetic area was more extensive immediately above the point of injection than below. The extent of surface on which the above effects were produced was about half an inch above and a quarter of an inch below the point of injection; while for about half an inch around this area there was a slight diminution to tactile, painful, and thermal impression. They have performed two minor surgical operations painlessly after an injection of one-seventh of a grain.

We have given only some of the more striking pieces of evidence that have been brought forward.—*Chemist and Druggist.*

CHEESE-MAKING.

RENNET AND SALT.

The following address was delivered by J. B. Harris, Canadian Cheese Instructor in Galloway and Dumfriesshire, at the meeting of the Scottish Dairy Association in Kilmarnock on Wednesday week :—

Rennet is the second agent applied in cheese-making, heat being the first. It does not seem to be thoroughly understood by cheese-makers, as they use the same quantity in spring, summer, and autumn, regardless of the quality of the milk, or time of curing their product. I might write a treatise on rennet, but we will take it for granted that all know how to prepare it. It this short paper I will only touch on its use. I was requested by your secretary to read a short paper on some subject of my own choosing, and knowing that rennet and salt were the shoals that wrecked most cheese-makers, I thought it best to give a few hints on these important agents. I have made remarks over and over on the importance of proper treatment with rennet and salt.

Rennet seems to be the only sure agent by which the cheesy matter of milk can be separated from the whey. Nature seems to have provided it for the cheese-makers' especial use. Its office is not simply to produce coagulation ; it goes further, and exercises an important part not only in the curing of the cheese, but also in bringing about that condition which we call digestibility. No other substance of which we have any knowledge is capable of bringing about the same result. In view of these facts more than one idea should govern us in the use of the rennet. If it is intended that the cheese shall go into market in from forty to fifty days (which should always be the case in the early part of the season with fodder-made cheese), enough of rennet should be used to ensure the process of coagulation, beginning in form 10 to 12 minutes, with milk in proper condition. Rennet sufficient to accomplish this result will, in the time limited for sale, have performed all that is desired in preparing the product for the table. It will be seen by this, if we have been clear in explaining the idea, that the time of curing rather than the condition and quality of milk should govern the quantity used. Milk well matured will coagulate with less rennet than when sweet and new, but this should make no difference with the quantity used, as the curing of the cheese is what we must consider. If the milk is partly skimmed, or in a time of year that it is not so rich, more rennet should be used, as the richer the milk, the less rennet is required. This is where many cheese makers fail, who never change their quantity in spring, summer, or autumn. I found many dairies the past season in which splendid cheese was made through June, July, and part August ; but when milk became richer, by reason of the cows giving a less quantity, their cheese was soft. If they had decreased their rennet, and increased their heat and salt, their product would have been firm, solid, and good in texture.

The office of rennet cannot be explained more definitely than by saying that when it is mingled with milk it solidifies the caseine or albuminous portion of that fluid. This solidification is called coagulation In the coagulation of milk the cream is held in suspension and the whey expelled. The function of rennet in curing is much the same as that of the gastric juice of the stomach, breaking down as it does the fibre of the curd, and carrying it towards a condition like that of chyle in the digestive process.

There are no rules by which we may be governed in the use of salt other than very general ones. We should bear in mind always that a portion passes off in the whey in pressing, more or less according to the amount of moisture contained in the curd. We should remember that the purpose of salt is not simply to secure flavour ; it is used also as a preservative, and a check upon the action of rennet. We must therefore have in mind four distinct considerations in the application of salt. First, the amount of loss to be sustained in pressing ; second, flavour ; third, the amount of rennet used ; and fourth, the time of curing. By the use of salt we so balance a set of natural processes as to compel them in a given length of time to produce for us a given result—it depending altogether on the skill of the operator what that result shall be.

From what has been said it will appear that little, if anything, can be effected by the use of figures in regard to the quantity of salt to be used. However, we will give two general propositions which may serve in some degree as a guide to the operator in this matter.

When curd contains about 40 per cent of moisture it is in its normal condition, and when this is the case and we desire to sell in 40 or 50 days, we should use 1¼ lbs. to each 100 lbs. of curd. Again, with the curd normal in moisture, if we desire that our product remain on ourshelves indefinitely, we should use 2¼ lbs.

From this it will be seen that in the use of the salt we should take into consideration not only the condition of the curd as to moisture, but also the time that is required for curing, thus avoiding the error of using a quantity of salt which would counteract or limit the action of the rennet, as it is a well-known fact that salt and rennet work in opposite directions.—*N. B. Agriculturist.*

TEA AND HOW TO MAKE IT.

The following letter, dated 14th March 1885, was addressed by H. Z. Darrah, Esq., officiating Director of Agriculture, Assam, to G. M. Barton, Esq., Secretary, Indian Tea Association, and will doubtless be read with interest by lovers of tea :—

About the middle of last month I visited the Bhutia encampment of Dewangiri, and among other matters, I enquired into the subject of tea. I found that the Bhutias had as usual brought with them a few bricks of the commodity they designate tea. I obtained a small quantity, and noted a few particulars, which may possibly prove of interest.

2. The Bhutias stated that the tea was brought by traders from a place called Janarjippoo, situated a year's journey to the north-east. To indicate the direction, they pointed at first due north, and then due east, intimating that a traveller to Janarjippoo from Bhutan would have first to go north and then east. They stated that they had given in exchange for a brick two cloths of eri-silk, each cloth containing as much thread as they had bought for the equivalent of Rs. 1-4 in the Assam Valley. Estimating roughly the labour of weaving at 12 annas per cloth, the cost of the tea would appear to have been Rs. 4 per block. That this could not be its real price in Bhutan was proved by the fact that I bought it at Rs. 3-8 in Dewangiri. The price last year was as far as I can ascertain Rs. 2 4 in the same place. The Bhutias stated that it had became dearer in the interior. I enquired why they drank tea which had come such a distance, when a much cheaper kind was to be obtained in Assam. They stated that Assam tea was bitter, but the tea they had with them was sweet.

3. I watched in one instance the process of making the infusion : The pots, one of brass and filled with water, the other an earthen one and empty, were put over a fire ; a piece was broken off a brick of tea and crumpled up in the hand to separate the adhering leaves and twigs. The handful so obtained was put into the dry earthen pot and stirred up for [illegible] few seconds till hot. Then, about a couple of wine glasses of potash water (made by straining water through ash[illegible] poured on the dry tea, and when the heat had almost ev[illegible] the moisture, another spoonful of water (now hot) was ad[illegible] the brass pot. The tea meanwhile was kept stirred to p[illegible] burning, and when nearly dry, a second, and then after[illegible] val a third, spoonful of water was added ; when this, [illegible] almost dry, all the water from the brass pot was poure[illegible] a teaspoonful of salt having been put in, the mixture w[illegible] As soon as the bubbles showed that the liquid was boi[illegible] ladled out with a spoon formed from a gourd into a [illegible] made from a thick piece of bamboo about two feet long. Th[illegible] churn was provided with a wooden cover, through a hole in which a piston-rod worked, the piston being simply a round piece of wood, roughly fitting the interior of the churn. The boiling liquid having been poured in, the churn was worked for a few seconds, and then about a tablespoonful of ghee was added to the mixture. The churn upon this was worked vigorously for a few minutes, considerable pressure being evidently required to force the piston up and down. The Bhutia next poured back the liquid into the earthen pot (which meanwhile had remained on the fire) and tasted the tea. He stated that more salt was wanted, and add[illegible] accordingly about an eggspoonful. The whole was boiled again [illegible] about a minute, and then tasted and pronounced excellent. Th[illegible] amount was about equal to the contents of two ordinary quart bottles.

4. Attempts have, I believe been made to produce from the refuse of tea gardens a substance resembling Bhutia brick tea, but so far, I believe, they have been unsuccessful. It would seem, however, that the endeavour should not be given up as there can be little doubt that if planters could manufacture a commodity which would suit the taste of the Bhutias, Assam tea might penetrate eventully in Central Asia. Bhutia tea can hardly be the produce of any country but China, and although recent [illegible] quiries tend to show that China tea can be carried wo[illegible] cheap into Thibet, yet it is hardly possible that Assam [illegible] not undersell it. Even supposing that the Bhutias [illegible] doubled the real price to their statement to me, and tha[illegible] Chinese tea can be bought at Rs. 1-8 per brick (about 5 [illegible] per lb.), I imagine an Assam planter [illegible] similar article at all, could do so for 3 annas [illegible]. This would certainly enable him to sell with a pro[illegible] at a price which would probably induce the Bhutias to bu[illegible]

5. The obvious objection to any attempts t[illegible] manufacture brick tea is that, even if made, trade with the [illegible] tribes on the Assam border is too inconsiderable to produce [illegible] effect on the tea industry of Assam The objection is perf[illegible] sound as far as these tribes are themselves concerned, but will not apply if we can once break the Chinese monopoly. [illegible] the Bhutias perceive that they can buy the materials for [illegible] extraordinary mixture they call tea at a cheaper rate in [illegible] than in Bhutan itself, they are certain to make their pur[illegible] here instead of in the interior. Once introduced at a [illegible] rate into Bhutan, it is more than probable that our tea would [illegible] into Thibet, and its spread in the interior of Central Asia would be then regulated mainly by the cost of its carriage from Assam, as compared with the cost of carriage of Chinese [illegible] from China.

6. The above considerations had led me to obtain samples of the stuff the Bhutias use, and I am sending you a small box containing three bricks of tea and two sealed bottles of the infusion I saw manufactured. You will be the best judge of the method in which [illegible] the samples, should you consider the subject sufficiently [illegible] your taking action.

BOGUS BUTTER.

We are in receipt of a little publication by Prof. Lorenzo Fagerstén on the art of testing and distinguishing between genuine and bogus butter, by an apparatus of his invention. It has numerous illustrations showing the appearance under the microscope of the living germs found in such bogus [illegible], which we are unable to reproduce. The following, however, taken from the treatise will be of interest. We only wish the little pamphlet with its illustrations could have a wide circulation among the butter consumers of the country.

WHAT IS BOGUS BUTTER.

1. Bogus butter is raw lard or raw tallow deprived of its offensive smell by means of acids or alkalies, and generally churned with milk in order to acquire by chemical decomposition a bogus [illegible] flavour.

2. Explanation of process:

"The sugar of milk is split up into lactic acid, and part of the lactic acid is converted into butyric acid (bogus flavour). The process being accompanied by putrid fermentation, and the development of myriads of microscopic infusoria or organisms of vegetable and animal origin" closely allied to the germs supposed to be the cause of infectious diseases.

3. Living organisms.

These are classed as follows: First—Sour fermentation. Second—Rancid fermentation. Third—Putrid fermentation.

"These organisms move forward by sliding. Their body remains rigid or undulates slightly; they balance themselves on end and agitate their extremities, they are often bent."

"These singular organisms are reproduced by fission."

4. When deodorization is accomplished by alkalies, the lye used gelatinizes the animal membranes and skins surrounding the lard or tallow into a glue. Soap is formed. White specks of alkali and protein compounds adhere to the sides, and a coarse alkaline [illegible]der sinks to the bottom of the tube.

[illegible] When the object of the butter mixer has been obtained, the [illegible] of the originally transparent lard or tallow is manifest[illegible] by the ropy and turbid opaqueness of the product.

[illegible] he [illegible] raw lard or raw tallow is deodorized by mineral [illegible] increa[illegible]tion takes place.

[illegible] part of the hydrogen of the fat is displaced by nitro[illegible] [illegible] or sulphur of the acids, and, under favorable con[illegible] [illegible] fat is deprived of part of its carbon, which unless [illegible] into oxalic acid.

[illegible] effect is, in the main, the same as mentioned in No. [illegible] fat now assumes a reddish tint; skins and [illegible] mucilage, [illegible] the bottom like lumps of jelly. Water [illegible] always strongly acid.

6. Raw lard or raw tallow cannot be churned or mixed with genuine butter without the changes taking place mentioned in No 2, as a temperature from 80 to 100 degrees would have to be maintained for a sufficient time to animate the mixture.

7. Bogus butter when made has reached the limit of its acidity, any further change in its composition is to putrefaction.

8. Genuine butter is a mixture of neutral fats—glycerides—which may be divided into two [illegible] classes.

Sub class 1.—High in carbon, melts at a high temperature, and non-volatile. Fat becomes transparent at 150 degrees or over ([illegible] all butter.)

Sub class 2—Low in carbon, melts at a low temperature, volatile and fragrant. Fat becomes transparent between 93 and 105 degrees (Grass butter.) No free fatty acids being present.

Grass butter is rich in fats of sub class 2, and will not keep so well as fall butter, which consists mainly of fats of sub class 1.

9. Bogus butter is a corruption of raw lard or raw tallow in the form of chlorine, sulpho, or nitro derivatives, mixed with free [illegible] and mineral acids, animal skins—sometimes gelatinized [illegible]—and undergoing the process of lactic, butyric, and putrid [illegible]tion.

[illegible] any temperature below 212 degrees.

IS BOGUS BUTTER WHOLESOME?

10. [illegible] acid causes irritation of the bowels and is productive o[illegible] [illegible]atic pains.' [illegible] and rapidity of its action has Oxalic ac[illegible] [illegible] suicidal purposes.' caused it to [illegible] bacteria and infusoria in general are The effects [illegible] any repetition, and the possibility of too well known [illegible] and tape worm eggs is equally well es the presence of tr[illegible] tablished.

Mineral acids, a[illegible] glue, stearic acid, soap, and skins cannot properly be class[illegible] condiments.

11. Any chemical ana[illegible] fats is incomplete unless qualified by optics and micros[illegible]—*Farmers' Review.*

Holloway's Ointment a[illegible] —Autumnal Remedies.—Towards the fall of the year count[illegible] great work to lower the tone of the nervous system, w[illegible] be followed by ill health unless proper means be employed [illegible] that evil. Holloway's far famed preparations supply a fau[illegible] remedy for both external and internal complaints consequent [illegible] changes of season. All affections of the skin, roughness, [illegible] pimples, superficial and deeper seated inflammations, erysipelas, rheumatic pains, and gouty pangs alike succumb to the [illegible] of Holloway's Ointment and Pills, which will effect a [illegible] revolution in the patient's condition, though the symptoms [illegible] are legion, and have obstinately withstood the be[illegible] [illegible] to subdue them.

A SKILFUL SURGICAL OPERATION.

The American Ambassador at Vienna, Mr Kasson, has lately forwarded to his Government an interesting account of a remarkable surgical operation lately performed by Professor Billroth, of Vienna, which, wonderful to tell, consisted in the removal of a portion of the human stomach, involving nearly one third of the organ—and, strange to say, the patient recovered—the only successful operation of the kind ever performed. The disease for which this operation was performed was cancer of the stomach, attended with the following symptoms:—The appetite is quite poor. There is a peculiar indescribable distress in the stomach, a feeling that has been described as a faint "all gone" sensation; a sticky slime collects about the teeth, especially in the morning, accompanied by an unpleasant taste. Food fails to satisfy this peculiar faint sensation; but, on the contrary, it appears to aggravate the feeling. The eyes are sunken, tinged with yellow; the hands and feet become cold and sticky—a cold perspiration. The sufferer feels tired all the time, and sleep does not seem to give rest. After a time the patient becomes nervous and irritable, gloomy, his mind filled with evil forebodings. When rising suddenly from a recumbent position there is a dizziness, a whistling sensation, and he is obliged to grasp something firm to keep from falling. The bowels costive, the skin dry and hot at times; the blood becoming thick and stagnant, and does not circulate properly. After a time the patient spits up food soon after eating, sometimes in a sour and fermented condition, sometimes sweetish to the taste. Often times there is a palpitation of the heart, and the patient fears he may have heart disease. Towards the last the patient is unable to retain any food whatever, as the opening in the intestines becomes closed, or nearly so. Although this disease is indeed alarming, sufferers with the above named symptoms should not feel nervous, for nine hundred and ninety-nine cases out of a thousand have no cancer, but simply dyspepsia, a disease easily removed if treated in a proper manner. The safest and best remedy for the disease is Seigel's Curative Syrup, a vegetable preparation sold by all chemists and medicine vendors throughout the world, and by the proprietors, A. J. White (Limited), 17, Farringdon road, London, E.C. This Syrup strikes at the very foundation of the disease, and drives it, root and branch, out of the system.

St. Mary Street, Peterborough,
November 29th, 1881.

Sir,—It gives me great pleasure to inform you of the benefit I have received from Seigel's Syrup. I have been troubled for years with dyspepsia, but after a few doses of the Syrup, I found relief and after taking two bottles of it I feel quite cured.

I am, Sir, yours truly,
Mr A. J. White. William Brent.

September 8th, 1883.

Dear Sir,—I find the sale of Seigel's Syrup steadily increasing. [illegible] mighty [illegible] medicinal virtues; one customer described it as a "Godsend to dyspe[illegible]" [illegible] always recommend it with confidence.—Faithfully yours,

(Sd.) Vincent A. Wills,
To Mr A. J. White. Chemist Dentist, Merthyr Tydvil.

Seigel's Operating Pills are the best family physic that has ever been discovered. They cleanse the bowels from all irritating substances, and leave them in a healthy condition. They cure costiveness.

Preston, Sept 21st, 1883.

My dear Sir,—Your Syrup and Pills are still very popular with my customers, many saying they are the best family medicines possible.

The other day a customer came for two bottles of Syrup and said "Mother Seigel" had saved the life of his wife, and he added, "one of these bottles I am sending fifteen miles away to a friend who is very ill. I have much faith in it."

The sale keeps up wonderfully, in fact, one would fancy almost that the people were beginning to breakfast, dine, and sup on Mother Seigel's Syrup, the demand is so constant and the satisfaction so great.

I am, dear Sir, yours faithfully,
To A. J. White, Esq. (Signed) W. Bowker.

Spanish Town, Jamaica, West Indies, October 24, 1882.

Dear Sir,—I write to inform you that I have derived great benefit from "Seigel's Syrup." For some years I have suffered from liver complaint, with its many and varied concomitant evils, so that my life was a perpetual misery. Twelve months ago I was induced to try Seigel's Syrup, and although rather sceptical, having tried so many reputed infallible remedies, I determined to give it at least a fair trial. In two or three days I felt considerably better, and now at the end of twelve months (having continued taking it), I am glad to say that I am a different being altogether. It is said of certain pens that they "come as a boon and a blessing to men," and I have no reason to doubt the truthfulness of the statement. I can truly say, however, that Seigel's Syrup has come as a "boon and a blessing" to me. I have recommended it to several fellow-sufferers from this distressing complaint, and their testimony is quite in accordance with my own. Gratitude for the benefit I have derived from the excellent preparation, prompts me to furnish you with this unsolicited testimonial.

I am, dear Sir,
Yours ever gratefully,
(Signed) Carey B. Berry,
A. J. White, Esq. Baptist Missionary.

Hensingham, Whitehaven, October 16, 1882.

Mr. A. J. White.—Dear Sir,—I was for some time afflicted with piles, and was advised to give Mother Seigel's Syrup a trial, which I did. I am now happy to state that it has restored me to complete health.—I remain, Yours respectfully,

(Signed) John H. Lightfoot.
(c.)